Primary 4



MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
وزارة التربية والتعليم والتعليم الفني

Math Term 1

2023 - 2024

To obtain permission(s) or for inquiries, submit a request to:

Discovery Education, Inc.
4350 Congress Street, Suite 700
Charlotte, NC 28209
800-323-9084
Education_Info@DiscoveryEd.com

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Revised by

Dr. Mohamed Mohyeldin Abdelsalam

Eman Sayed Ramadan Mohamed

George Yuhanna Meikheil Gerges

Supervision

Dr. Akram Hassan Mohamed

Head of the Central Administration for Curriculum Development

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Table of Contents

Foreword and Words from the Minister of Education and Technical Education viii
Letter to the Parent/Guardian x

Theme 1 | Number Sense and Operations

Unit 1 Place Value

Concept 1.1 Reinforcing Place Value

Lesson 1 Big Numbers 3
Lesson 2 Changing Place Values 5
Lesson 3 Many Forms to Write Numbers 7
Lesson 4 Composing and Decomposing 9

Concept 1.2 Using Place Value

Lesson 5 Comparing Big Numbers 12
Lesson 6 Comparing Numbers in Multiple Forms 14
Lesson 7 Descending and Ascending Numbers 17
Lesson 8 Rounding Rules 20

Unit 2 Addition and Subtraction Strategies

Concept 2.1 Using Addition and Subtraction Strategies

Lesson 1 Properties of Addition 24
Lesson 2 Addition with Regrouping 27
Lesson 3 Subtraction with Regrouping 29

Concept 2.2 Solving Multistep Problems

Lesson 4 Bar Models, Variables, and Story Problems 32
Lesson 5 Solving Multistep Story Problems with Addition and Subtraction 35

Unit 3 Concepts of Measurement

Concept 3.1 Metric Measurement

Lesson 1 Measuring length 40
Lesson 2 Measuring Mass 43
Lesson 3 Units of Capacity 45

Concept 3.2 Measuring Time

Lesson 4 Units of Measuring Time 48
Lesson 5 Elapsed Time 50
Lesson 6 Applications of measurement 1 53
Lesson 7 Applications of measurement 2 56

Unit 4 Area and Perimeter

Concept 4.1 Explore Area and Perimeter

Lesson 1 Finding perimeter 59
Lesson 2 Finding area 62
Lesson 3 Unknown Dimensions 64
Lesson 4 Complex Shapes. 66

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 5 Multiplication as a Relationship

Concept 5.1 Multiplicative Comparisons

Lesson 1 Multiplicative Comparison 71
Lesson 2 Creating Multiplicative Comparison Equations 73
Lesson 3 Solving Multiplicative Comparison Equations. 75

Concept 5.2 Properties and Patterns of Multiplication

Lesson 4 Commutative Property of Multiplication 77
Lesson 5 Identity Property and the Zero Property 79
Lesson 6 Associative Property of Multiplication. 81
Lesson 7 Applying Patterns in Multiplication 83

Unit 6 Factors and Multiples

Concept 6.1 Understanding Factors

Lesson 1 Identifying Factors of Whole Numbers 86
Lesson 2 Prime and Composite Numbers 88
Lesson 3 Greatest Common Factor G.C.F 91

Concept 6.2 Understanding Multiples

Lesson 4 Identifying Multiples of Whole Numbers 93
Lesson 5 Common Multiples 95
Lesson 6 Relationships between Factors and Multiples 97

Unit 7 Multiplication and Division: Computation and Relationships

Concept 7.1 Multiplying by 1-Digit and 2-Digit Numbers

Lesson 1 The Area Model Strategy 100
Lesson 2 The Distributive Property 102
Lesson 3 The Partial Products Algorithm 104
Lesson 4 multiply by a one-digit number 107
Lesson 5 multiply a two-digit number by a multiple of 10 109

Concept 7.2 Dividing by 1-Digit Divisors

Lesson 6 Exploring Remainders 111
Lesson 7 Patterns in Division 113
Lesson 8 The Area Model and Division 116
Lesson 9 The Partial Quotients Algorithm 117
Lesson 10 The Standard Division Algorithm 119
Lesson 11 Division and Multiplication 121

Unit 8 Order of Operations

Concept 8.1 Order of Operations

Lesson 1 Order of Operations 124
Lesson 2 The Order of Operations and Story Problems 126

FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2 and Primary 1. In 2021 we have rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Central Administration for Curriculum Development" (CACD) and "Discovery Education," .

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

WORDS FROM THE MINISTER OF EDUCATION & TECHNICAL EDUCATION

Dear students and fellow teachers,

It gives me great pleasure to celebrate this crucial stage of comprehensive and sustainable development, an epic in which all Egyptian people are taking part. This pivotal stage necessitates paving a foundation for a strong educational system which yields a generation that is not only capable of facing the major challenges the world is witnessing today, but one that also has complete possession of the skills of the future.

At a time when our world is witnessing successive industrial revolutions, the Egyptian state is keen on empowering its citizens by establishing a top-notch educational system that invests in its children the expertise required to get them to compete at both a regional and global level. This dictates that our educational system has at its core an emphasis on skills development, deep understanding, and knowledge production. This can only be done through modern curricula that keep up with the changes taking place globally-- curricula which prioritize the development of skills and values, and the integration of knowledge. They are also curricula that focus on the provision of multiple learning sources, and integration of technology to enrich the educational process and to improve its outcomes, while addressing the most important contemporary issues.

To achieve this, we must all join hands to continue to revolutionize our education, and to support it with all that is required to transform it into a globally pioneering educational system.

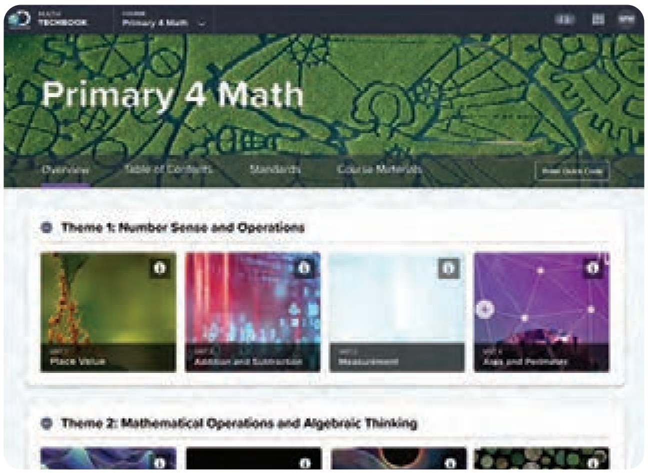
My warmest regards to you, dear students, and my deepest gratitude to my fellow teachers.

Professor Reda Hegazy

Minister of Education & Technical Education

Dear Parent/Guardian,

Welcome to Primary 4 Mathematics TechbookTM! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



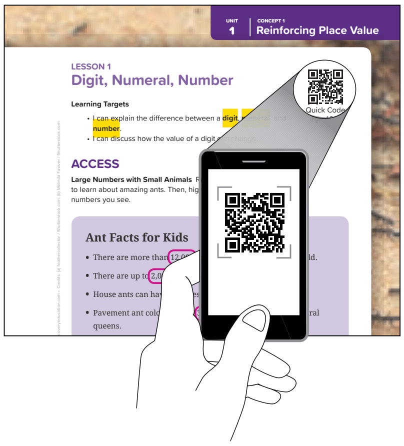
Primary 4 Mathematics Techbook was designed and written to teach to the Ministry of Education Primary 4 mathematics standards. The structure of Primary 4 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

Primary 4 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 5 and beyond. Primary 4 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 4 includes multiplication, division, fractions, decimals, and plane figures such as lines, line segments, rays, and angles. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They solve fraction multiplication problems, connect angle measurement to fractions, explore the inverse relationship between multiplication and division, and draw parallels among decimal numbers, fractions, and place value. Students learn to think like mathematicians as they notice patterns and rules,

persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 4 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.



Primary 4 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

CONNECT Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, **WRAP-UP**, **PRACTICE**, and **CHECK YOUR UNDERSTANDING** features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and quick codes that take you and your student to a corresponding section of Primary 4 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

Sincerely,

The Discovery Education Math Team

UNIT 1

Theme 1 | Number Sense and Operations

Unit 1
Place Value



Mighty Ant Facts

Unit Video Questions

Quick Code
egm4008

In this unit, you will meet Omar and Mariam, two students who are amateur myrmecologists. A myrmecologist is someone who studies ants. As part of their ant study project, they find ant colonies, study ant behaviors, and count ants to track populations and the health and variety of local ant colonies. This research requires them to count, read, write, and compare very big numbers.

- ☐ How can you use what you already know about place value to learn about numbers to the Milliards place?
- ☐ What strategies can you use to read and write really big numbers?
- ☐ How can you use place value to compare and order really big numbers?

LESSON 1

Big Numbers

Learning Targets

- I can identify all whole number **place values** through the One **Milliard** place.
- I can explain how a digit's location in a number affects its value.

ACCESS

Exploring Place Value Talk with your Shoulder Partner. Record what you remember about the place value system from earlier grades. Be prepared to share your thinking with the class.

BUILD

Reading the Place Value Chart Use the place value chart to help you read the number aloud with your teacher. Write numbers in the place value chart with your teacher. The first one is done for you.

	period			period			period		
Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
		3	5	8	9	1	4	5	5

HANDS-ON ACTIVITY

Creating Big Numbers

Practice creating, reading, and comparing really big numbers.

1. Place all digit cards face down in the middle and mix them up.
2. One person in the group turns over a digit card. Each player independently decides which place value to put the digit in and records the digit in their own place value chart.
3. The next student turns over a card. Each player independently decides which place value to put the digit in and records the digit in their own place value chart.
4. Repeat until all spaces in the row have been filled. Then, players compare their numerals. The player with the greatest numeral wins a point. There is room to play 5 rounds.

	period			period			period		
Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

Track your points.

CONNECT

Writing About Math Amir says that in the number 222, all of the digits have the same value. Do you agree or disagree? Use words and numbers to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 2
Changing Place Values

Learning Targets

- I can explain how the value of a digit changes as it moves to the left in a number.
- I can describe the patterns I see as a digit changes value.

ACCESS

Multiplying by Ten Use your Tens rods to explore patterns in multiplying by 10.

1. What quantity is represented by your Tens rods? Draw a picture, write an equation, or write a number to show the quantity.
2. What quantity is represented by your group's Tens rods? Draw a picture, write an equation, or write a number to show the quantity.

BUILD

What Is My Value? Follow the steps to explore how a digit's value changes when its location changes.

- Choose one digit and enter it in the Ones place.
- Record the value of the digit.
- Continue moving the digit card to the left on the place value chart, recording its new value each time.

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

My digit is ________________

Value of my digit in the Ones place ________________

Value of my digit in the Tens place ________________

Value of my digit in the Hundreds place ________________

Value of my digit in the Thousands place ________________

Value of my digit in the Ten Thousands place ________________

Value of my digit in the Hundred Thousands place ____________________

Value of my digit in the Millions place ____________________

Value of my digit in the Ten Millions place ____________________

Value of my digit in the Hundred Millions place ____________________

Value of my digit in the One Milliards place ____________________

Exploring Place Value Relationships Work with your teacher to explore place value relationships.

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

Choose the value from the word bank that completes the sentence.

1	10	100	1000

As a digit moves one space to the left on the place value chart, its value = ______________ times.

CONNECT

Omar and Mariam are **myrmecologists** (scientists who specialize in studying ants). They found a colony with 10 anthills. Remarkably, each anthill had the same number of ants.

Multiplying Ants Look at each problem in the table. If Omar and Mariam found the given number of ants in each anthill, how many ants were there all together? Show your work for each problem.

7 ants in 1 anthill. __________ ants in 10 anthills.	92 ants in 1 anthill. __________ ants in 10 anthills.
12 ants in 1 anthill. __________ ants in 10 anthills.	156 ants in 1 anthill. __________ ants in 10 anthills.
28 ants in 1 anthill. __________ ants in 10 anthills.	1,786 ants in 1 anthill. __________ ants in 10 anthills.

Check Your Understanding

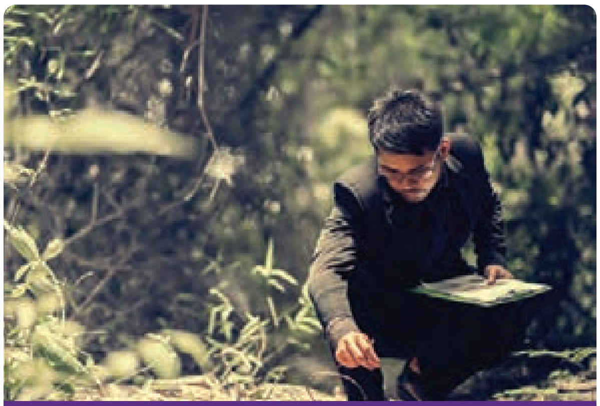
Follow your teacher's instructions to complete this activity.

LESSON 3
Many Forms to Write Numbers

Learning Target

- I can write numerals in standard, word, and expanded forms.

ACCESS



Scientist Collecting and Recording Data

Same or Different? Omar and Mariam are amateur myrmecologists, scientists who study ants. They are conducting research to find out if ant populations are declining. Part of their research involves counting the number of ants that live in one anthill. Every day they count ants.

At the end of the month, Omar recorded the number of ants he had counted as follows:

1,467,303,221

Mariam recorded her count in this way:

1,000,000,000 + 400,000,000 + 60,000,000 + 7,000,000
+ 300,000 + 3,000 + 200 + 20 + 1

BUILD

Numeral Form Exploration Compare the different forms of the same numeral. Use the information as a guide and reference.

Standard Form	9,231,043,204
Expanded Form	9,000,000,000 + 200,000,000 + 30,000,000 + 1,000,000 + 40,000 + 3,000 + 200 + 4
Word Form	nine milliard, two-hundred thirty-one million, forty-three thousand, two hundred four

Be prepared to share your thinking about these questions:

- What do you remember about these forms of writing numerals?
- What was easy?
- What was challenging?

HANDS-ON ACTIVITY

Creating the Greatest

Play Creating the Greatest with a partner to practice creating numbers and writing them in multiple forms.

- Combine decks of digit cards with your partner. Place the cards face down in a pile and mix them up.
- Turn over 10 digit cards and record the numbers in the order in which you turned them over.
- Rearrange the 10 cards to create the greatest numeral.
- Record the numeral in standard form, word form, and expanded form.

1. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
   Standard Form __________
   Expanded Form __________
   Word Form __________
2. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
   Standard Form __________
   Expanded Form __________
   Word Form __________
3. ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
   Standard Form __________
   Expanded Form __________
   Word Form __________

CONNECT

Writing About Math Highlight or circle the greatest numeral you created. How do you know that the numeral you chose was the greatest number of all of the numerals you created? Explain the strategy you used to make your determination. Be prepared to share your thinking with the class.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

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LESSON 4
Composing and Decomposing

Learning Target

- I can build and break down numerals in multiple forms.

ACCESS

We Have/Who Has? Sit with your small group. Then, play the game We Have/Who Has to practice reading large numbers in multiple forms.

Directions

1. One group starts by reading their card aloud together.
2. The group who has the "Who Has?" number raises their hands and then reads their card aloud.
3. Play until every group has used its card.

BUILD

Terminology Review Complete the activity to check your current understanding of the terms standard, word, and expanded form. For each term, write a definition and give an example.

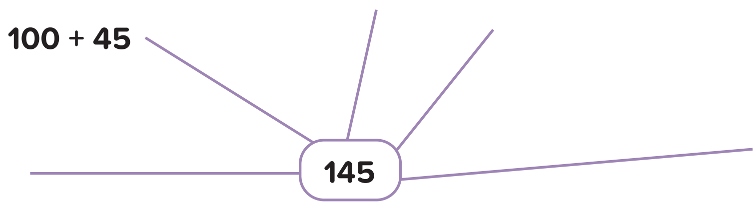
Vocabulary	Definition	Example
Standard Form		
Word Form		
Expanded Form		

Composing and Decomposing Do you remember the terms composing and decomposing from Primary 3? Look at the two images. What do you think the terms mean?


Ants **Composing** a New Anthill


Wind and Rain **Decomposing** This Anthill

Composing 145 What are some different ways we can compose 145? Use the web to record your ideas. One idea is given to get you started.



Composed and Decomposed Numbers Several composed and decomposed numbers follow. Fill in the missing numbers. Use the place value chart to help you. The first one has been done for you as an example.

Composed 345,532

Decomposed
(3 x 100,000) + (4 x 10,000) + (5 x 1,000) + (5 x 100) + (3 x 10) + (2 x 1)

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
				3	4	5	5	3	2

1. **Composed** 6,124,030,420 ____________________

Decomposed ____________________

____

____

____

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Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

2. **Composed** ____________________

   Decompose**d** ____________________

____

____

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O
5	4	0	0	1	5	9	0	2	4

3. **Composed** ____________________

   Decomposed (7 x 1,000,000,000) + (5 x 10,000,000) + (4 x 10,000) + (3 x 1,000) + (5 x 100) + (9 x 1)

For the next problem, choose your own number and show it composed and decomposed.

4. **Composed** ____________________

   Decomposed ____________________

____

____

Milliards	Millions			Thousands			Ones		
O	H	T	O	H	T	O	H	T	O

CONNECT

Writing About Math Reflect on today's Learning Target and your learning progress. Respond to the questions.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Comparing Big Numbers

Learning Target

- I can use symbols and place value to compare large numerals.

ACCESS

Error Analysis Analyze the student's work and their answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Record the following numeral in standard form:

(6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100).

Student's answer: 6,543

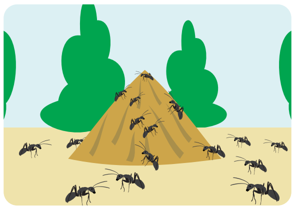
What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Comparing Anthills Highlight or circle the digits that are the same in both numbers.

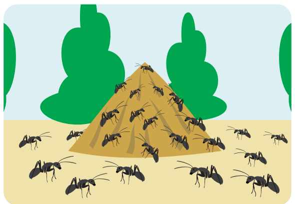
When comparing two numerals, if the first digit is the same in both numerals, how do we determine which numeral is greater?

Anthill 1



14,108

Anthill 2

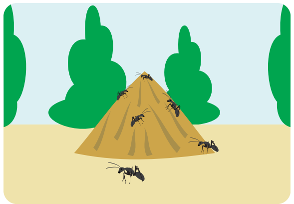


15,108

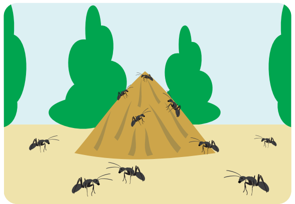
Using Greater Than and Less Than to Compare

Using Greater Than and Less Than to Compare Compare each anthill by writing < , > , or = in the space between them.

1.

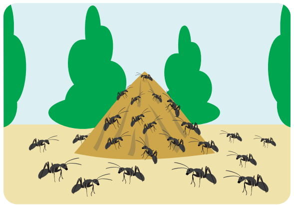


123,568

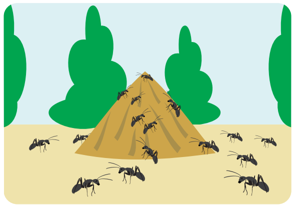


123,978

2.

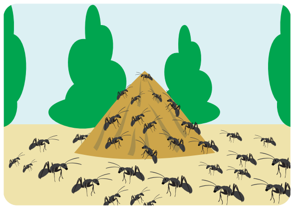


6,235,678

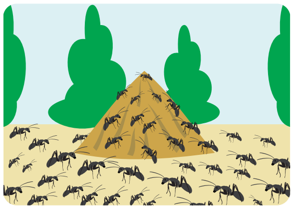


6,235,508

3.



2,450,890,007



2,500,000,000

Write an Explanation

1. Go back to one of the anthill problems and write an explanation for how you knew which symbol to use.
2. Create numbers that make the comparison true. Use all the lines.

   ____ ____ ____, ____ ____ ____, ____ ____ ____ < 890,789,000

   2,456,800,900 > ____, ____ ____ ____, ____ ____ ____, ____ ____ ____
3. In the space provided, write each numeral that you created in the previous problem. Then, write a comparison symbol between the two numerals to express their relationship.

CONNECT

Writing About Math When comparing large numbers, what strategies do you use to determine the greater number? Use words and numbers to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Comparing Numbers in Multiple Forms

Learning Targets

- I can compare numbers in multiple forms.
- I can describe the strategies I use to compare numbers.

ACCESS

Comparing Anthill Populations Work with a partner to compare the populations of the anthills by writing < , > , or = in the center column.

	Anthill	< , > , =	Anthill
1	40,000 + 3,000 + 100 + 10		40,000 + 3,000 + 100 + 20
2	five milliard, two hundred twenty million, five hundred-six thousand, forty		five milliard, two hundred twenty million, five hundred forty thousand, six
3	one million, nine hundred seventy-six thousand, eight hundred eighty-eight		1,000,000 + 900,000 + 70,000 + 6,000 + 800 + 80 + 8

Photo Credit: Rajath Raghav / Shutterstock.com

BUILD

Strategies for Comparison Review with a partner what you have learned about decomposed form and create a definition.

Decomposed form example:
(6 x 100,000) + (5 x 10,000) + (4 x 1,000) + (3 x 100)

Work in pairs or small groups to compare each set of numbers in the chart. Use < , > or =. Think about *how* you are doing the comparisons (what are your strategies?).

		< , > , =	
1	14,780,064		14,790,064
2	5,193,492,500		five milliard, three hundred million, seven hundred fifteen thousand, forty-three

		< , > , =	
3	(7 x 100,000,000) + (4 x 10,000,000) + (9 x 10,000) + (8 x 10) + (1 x 10)		70,000 + 9,000 + 600 + 40 + 3
4	Seventeen million, four hundred twenty-five thousand, six hundred five		17,420,605
5	8,040,761,903		8,000,000,000 + 400,000,000 + 700,000 + 60,000 + 1,000 + 900 + 3
6	Four hundred twenty-three thousand, twelve		400,000 + 30,000 + 20,000 + 20 + 1

7. Put a star next to the set that was the easiest for you to compare.
   Put an x next to the set that was the hardest for you to compare.

HANDS-ON ACTIVITY

Number Battle

This game requires 3 players. 2 players are "builders," and 1 player is the "reader."

Each player needs a set of digit cards 0–9. Players will combine the three decks (30 cards), shuffle the cards, and place them face down in the middle.

1. Each builder draws 11 cards.
2. Each builder uses 10 of their cards to create the greatest number possible and discards the 11th card.
3. The reader will read each builder's number aloud.
4. The builders write their number and their partner's number in their Student Edition. Be sure to pay attention to how the numbers should be recorded for each round.
5. The builders compare their numbers and record the appropriate sign (< or >).
6. The builders discuss: Which place value did you use to determine which number was greater?
7. Rotate roles and play again.

HANDS-ON ACTIVITY

Number Battle

Round	My Number	> or <	My Partner's Number
Standard Form			
Expanded Form			
Word Form			
Decomposed Form			

At the end of BUILD, circle the greatest number in your table and draw a box around the smallest number in your table.

CONNECT

Writing About Math What are the most effective strategies for you when comparing numbers in multiple forms? Which forms are easiest for you to compare? Which are hardest? Why? Use words and numbers to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Descending and Ascending Numbers

Learning Targets

- I can **order** numbers in multiple forms.
- I can describe the strategies I use to order numbers.

ACCESS

Error Analysis Analyze the student's work and their answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Compare the numbers below using < , > , or =

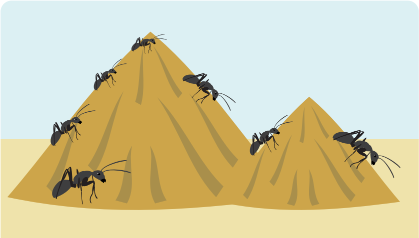
89,906 ________ 100,513

Student's Answer: I think 89,906 > 100,513 because 8 is larger than 1.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Ascending and Descending Numbers Omar and Mariam have been reading about ants in different regions. Omar found the total number of ants that go in and out of an anthill each day. Mariam found the total number each week. The first data set shows the numbers that Omar found for his region each day for 5 days.



Ants Ascending and Descending an Anthill

1. List Omar's data in ascending order:

78,090 79,010 78,091 79,100 78,999

________; ________; ________; ________; ________

Photo Credit: feathercollector / Shutterstock.com

The second data set shows the numbers that Mariam found for her region each week for a month.

2. List Mariam's data in descending order. You may use word or standard form.
    - three milliard, ten million, one thousand, thirty-four
    - three milliard, one million, three hundred twenty-three thousand, three hundred ninety-one
    - three milliard, nine hundred ninety thousand, nine hundred ninety-two
    - three milliard, one hundred ten million, ninety-nine thousand, four hundred ninety-three

3. List the numbers in ascending order. Use the form in which they are given.
    - four milliard, six hundred thousand, four
    - 461,014
    - four milliard six hundred thousand forty
    - (4 x 1,000,000,000) + (4 x 100,000) + (6 x 10)
    - 6,400,042

4. List the following in ascending order. Use standard form.
    - 654,301
    - six hundred fifty-four thousand, three hundred ten
    - 604,320
    - 654,311
    - five hundred ninety-nine thousand, three hundred ten

5. List the numbers in descending order. Use standard form.

- 5,000,000,000 + 40,000,000 + 5,000,000 + 7,000 + 90
- (6 x 1,000,000,000) + (3 x 10,000,000) + (5 x 1,000,000) + (6 x 10,000) + (9 x 100)
- five milliard, forty-one million, seven thousand, ninety
- 6,000,000,000 + 40,000,000 + 5,000,000 + 10,000 + 7,000 + 90
- 6,025,060,990

CONNECT

Writing About Math In the boxes, draw and label anthill images to help you remember the terms *ascending* and *descending*.

Ascending	Descending

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8
Rounding Rules

Learning Targets

- I can use multiple strategies to round numbers.
- I can identify which **estimation** strategy provides more **accurate** estimates.

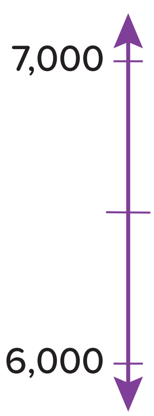
ACCESS

Remember Rounding? Record what you and your partner remember about rounding. After the class discussion, add the class notes to your notes.

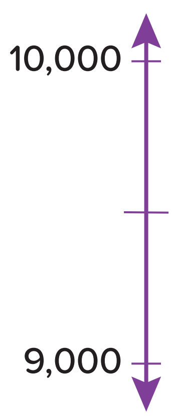
BUILD

Rounding Using the Midpoint Strategy For each problem that follows, record the midpoint of the number line. Then, identify where each number would go on the number line. Finally, round each number to the nearest thousand.

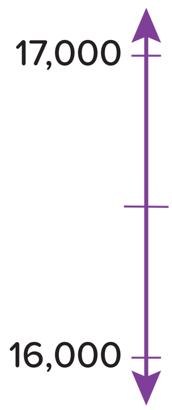
1. 6,700 ≈ ____________________



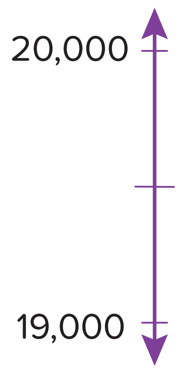
2. 9,340 ≈ ____________________



3. 16,401 ≈ ____________________



4) 19,654 ≈ ____________________



For each number, draw a number line, label the midpoint, and then round to the hundred thousands place.

5. 250,000 ≈

____



6. 700,500 ≈

____



Rounding Rule:

Circle the digit, look next door.

5 or higher? Add one more.

4 or less? Let it rest.

(Remember: The digits to the right become zeroes.)

Rounding Rule Use the Rounding Rule strategy to round the numbers that follow

to the given place value. Remember to circle the digit in the place value you are rounding and draw an arrow to show "looking next door." The first one is done for you.

Round the numbers to the nearest Thousand.

1. 234,432 ≈ ____________________

2. 7,578 ≈ ____________________

Round the numbers to the nearest Ten Thousand.

3. 290,290 ≈ ____________________

4. 7,435,026,353 ≈ ____________________

Round the numbers to the nearest Million.

5. 5,367,544 ≈ ____________________

6. 2,453,000,601 ≈ ____________________

Round the numbers to the nearest Milliard.

7. 5,266,747,023 ≈ ____________________

8. 10,944,352,543 ≈ ____________________

Photo Credit: Rajath Raghav / Shutterstock.com

CONNECT

Which Strategy is Best? **Rounding** numbers can help you determine whether or not your answer is **reasonable**. Look at the two rounding examples that follow.

47 →	40	Front-End Estimate Strategy	47	50	Rounding Rule Strategy
+ 31 →	+ 30		+ 31	+ 30	
	70			80	

Actual Answer: 47 + 31 = 78

Explain Which rounding strategy is more accurate. How do you know?

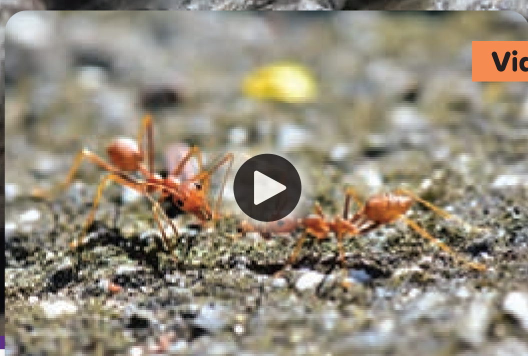
Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT
2

Theme 1 | Number Sense and Operations

Unit 2
Addition and Subtraction Strategies



Video

Calculation Ants

Quick Code
egm4050

Unit Video Questions

Omar and Mariam are investigating ant movement in and out of the ant mound. Soon they may need a faster way to add and subtract.

- ☐ How can you use patterns to determine strategies?
- ☐ What are some patterns you have observed this week?

LESSON 1

Properties of Addition

Learning Target

- I can identify the properties of addition.
- I can explain the properties of addition.
- I can investigate to determine if addition properties apply to subtraction.

ACCESS

Expanded Form Review Listen as your teacher reads numerals in expanded form. Write the numbers in standard form.

1. ______________________ 2. ______________________

3. ______________________ 4. ______________________

BUILD

Additive Identity Property Solve the following problems.

1. 2,345 + 0 ______________________	2. 0 + 12,567,109 ______________________

3. What did you notice about the problems?

4. Write a definition of the Additive Identity Property in your own words.

Photo Credit: frank60 / Shutterstock.com

Commutative Property Solve the following problems.

5. 5 + 7 + 8 + 3 ______	6. 8 + 7 + 3 + 5 ______	7. 7 + 5 + 8 + 3 ______	8. 3 + 7 + 8 + 5 ______

9. What did you notice about the problems?

10. Write a definition of the Commutative Property in your own words.

Associative Property Solve the following problems. Remember to solve what is in the parentheses first.

11. (10 + 4) + 20 + 17 ______	12. 10 + (4 + 20) + 17 ______	13. 10 + 4 + (20 + 17) ______

14. What did you notice about the problems?

15. Write a definition of the Associative Property in your own words.

Photo Credit: frank60 / Shutterstock.com

Do the Properties Apply? With your Shoulder Partner, answer the questions that follow.

Circle the property you and your partner have been assigned.

Associative **Commutative** **Additive Identity**

What is your prediction? Will your assigned property also be true for subtraction? Circle Yes or No.

Yes **No**

Create two problems to investigate whether your property applies to subtraction. You may use the number line to help you subtract.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Does your property apply to subtraction?

Yes **No**

Explain why or why not.

CONNECT

Writing About Math Describe what you discovered about the properties of addition and whether they apply to subtraction. Be sure to explain your findings. Use words and example equations to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2
Addition with Regrouping

Learning Targets

- I can add multidigit whole numbers.
- I can **estimate** to check the reasonableness of my answer.

ACCESS

Error Analysis Analyze the student's work. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Moaaz thinks that 4 – 0 would have the same answer as 0 – 4 because any number minus 0 equals that number.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Estimate and Solve Work with your partner to estimate the sums and then solve the problems.

1. 579 →
   + 62 → + ______

2. 8,049 →
   + 6,199 → + ______

CONNECT

Bridging Ants and Addition There are many different types, or *genera*, of ants. Army ants are known for being aggressive and are good hunters. One of the more interesting things that army ants do is create living bridges to help them span an elevated distance. Most of the bridges are made with around 50 ants. Once these bridges are complete, all the ants are able to safely move to the other side.



Ants Forming a Bridge

Photo Credit: frank60 / Shutterstock.com

1. A colony of ants is on a march through the jungle looking for food. On this march they made 2 bridges. The first bridge is composed of 142 ants. The second bridge is composed of 165 ants. How many ants were needed for both bridges? Show your work. Then, explain how you know your answer is reasonable.

Estimate

Exact

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Subtraction with Regrouping

Learning Target

- I can use place value to help me subtract with regrouping.
- I can estimate to check the reasonableness of my answers.

ACCESS

Error Analysis Analyze the student's work and answer in the space provided. Identify what the student did correctly and what they did incorrectly, and then try to solve the problem correctly.

Solve: 521 – 37 = ?

Student Work:

521 - 37 = 516

500 20 1 30 7

500 - 0 = 500

30 - 20 = 10

7 - 1 = 6

516

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Subtraction with Regroup Follow your teacher's directions to complete this learning activity.

$$\begin{array}{r} 3{,}328 \\ -\ 2{,}164 \\ \hline \end{array}$$

Use drawings to model 3,328 on the place value chart

Thousands			Ones		
H	T	O	H	T	O

Photo Credit: frank60 / Shutterstock.com

Ant Facts and Algorithms Read the short article. Then, follow your teacher's directions to complete the activity.

Can Ants Swim?

Some ants can swim, and some drown. It depends on the species. Some researchers took 35 species of tropical ants and dropped them into the water. Some of them were amazing swimmers, especially trap jaw ants. One species could swim an amazing 16–17 cm per second. That means in a minute the ant could swim 1,020 cm or approximately 10 meters!

Fire ants cannot swim, but they can join their legs to form a circular raft to survive floods. Sometimes, the entire ant colony will join legs to survive.

1. A trap jaw ant wanted to cross a river that was 3,548 cm across. The ant had already swum 1,672 cm. How much farther does the ant have to go?

2. Two colonies of fire ants were stuck in a flood and made floating rafts to survive. The first colony had approximately 1,267 ants and the second had 3,452 ants. How many more ants were in the second colony?



3. A fire ant colony 255,000 ants. A *Gigantiops destructor* ant colony has 6,200. What is the difference between the size of the two colonies?

CONNECT

Four Corners Follow your teacher's directions to participate in the Four Corners activity. Record your chosen strategy.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

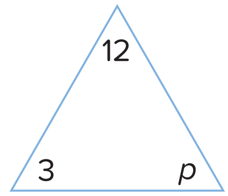
LESSON 4

Bar Models, Variables, and Story Problems

Learning Targets

- I can use letters to represent unknown quantities in equations.
- I can use **bar models** to represent and solve story problems.
- I can solve equations that include **variables**.

ACCESS



Introducing Variables What does it mean to be balanced? Look at the image of the triangle. What do you notice about it? Discuss your observations with your Shoulder Partner.

BUILD

Bar Models Read the following problems. Create a bar model and an equation for each problem, and then solve.

1. There are 5,328 ants in the colony. In the colony, 2,164 ants are females and the rest are males. How many male ants are in the colony?

   Bar Model:

   Equation: 2,164 + a = 5,398
   a = 5,398 - 2,164
   a = ...

   Solution:

2. There are 20,000 ants in the colony. In the colony, 12,000 are females and the rest are males. How many male ants are in the colony?

   Bar Model:

   Equation:

   Solution:

3. In colony A there are 1,200 ants. Some ants are out foraging for food and supplies, and 700 ants are taking out the colony's trash. How many ants are foraging for food and supplies?

   Bar Model:

   Equation:

   Solution:

4. There are 12,000 species of ants. Of these 12,000 species, 2,500 species live in Africa and the rest live in other parts of the world. How many species do not live in Africa?

   Bar Model:

   Equation:

   Solution:

Solving Equations with Variables Create a bar model to solve the following problems.

1. 14,000 – n = 6,000

   Bar Model:

   Solution:

2. b – 53,500 = 75,200

   Bar Model:

   Solution:

3. 725,625 + c = 935,075

Bar Model:

Solution:

4. 13,280 – d = 5,420

Bar Model:

Solution:

5. f + 205,925 = 810,775

Bar Model:

Solution:

CONNECT

Writing About Math Write a story problem involving addition or subtraction, where you need to find the unknown. Then write the equation and draw a bar model of the equation. Lastly, solve for the variable and check.

Word Problem:		
Equation:	**Bar Model (drawn):**	**Solve and Check:**

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Solving Multistep Story Problems with Addition and Subtraction

Learning Targets

- I can solve multistep story problems.
- I can explain how I solved multistep story problems.

Photo Credit: ErikJensen / Shutterstock.com

ACCESS

Hidden Question Answer the following questions:

1. Omar found a website created to study ant colonies. He saw that there were 1,025 ants in Colony A on Wednesday. On Friday, 101 ants leave the colony. How many ants are left in Colony A?

2. Mariam found the same website and saw that there were 1,555 ants in Colony B. How many more ants are in Colony B than in Colony A?

BUILD

Putting It Together Combine the two given story problems to create one story problem.



Ant Hills

1. Mariam saw on the website that several smaller Pharaoh ant colonies were joining together to form a larger colony. On Monday, 1,725 ants joined together with 22,750 ants. Then, another 6,075 ants joined. How many ants were in the larger colony on Monday?

   Omar checked the website on Friday and learned that there were now 50,750 ants in the colony. How many ants had joined the colony since Monday?

New multistep story problem:

____

____

____

____

Highlight or circle the hidden question in the multistep story problem you wrote.

Solving Multistep Story Problems Read the Steps to Solving Story Problems. Then, read the story problem. Next, read the steps a student took to solve the problem and number the steps from 1 to 6 to put them in the correct order.

Steps to Solving Story Problems

1. Circle important numbers and labels.
2. Underline questions.
3. Draw a box around operation clues.
4. Examine the information:
   - What is known?
   - What is unknown?
   - What is the hidden question?
5. Use what is known to answer the hidden question.
6. Use the new information to solve the problem and find the unknown.

Photo Credit: ErikJensen / Shutterstock.com

1. Ahmed had a pie with 340 calories for breakfast. Then, Ahmed had a glass of milk, an apple, and a chicken sandwich for lunch. The milk had 190 calories, the apple had 85 calories, and the chicken sandwich had 255 calories. If the average adult can eat 2,000 calories per day, how many more calories can Ahmed eat today?

   ______ I subtracted 870 from 2,000. The answer is 1,130, so Ahmed can eat 1,130 more calories today.

   ______ I drew a box around “how many more.”

   ______ I added the calories of the foods Ahmed has eaten to answer the hidden question (how many calories Ahmed has already eaten). The answer is 870 calories.

   ______ I circled 340 calories, 190 calories, 85 calories, 255 calories, and 2,000 calories.

   ______ I identified the known information (what Ahmed ate and how many calories each item had; the average adult is supposed to eat 2,000 calories per day). I identified the unknown information (how many calories Ahmed has already eaten; how many more calories Ahmed can eat).

   ______ I underlined “how many more calories should Ahmed eat today?”

Use the problem-solving steps to solve the story problems. Remember, you will have to answer the hidden question first and then answer the main question. Be sure to show your work.

2. The ant colony website hopes that a new colony with up to 173,500 will form. If a colony of 27,385 ants and a colony of 52,890 ants join the new colony, how many more ants can join?



3. The Great Pyramid had 59,000 visitors in January, 27,525 visitors in February, and 32,975 visitors in March. They expect to have 150,000 visitors by the end of April. How many visitors need to show up in April to reach this count?

4. New Valley has a population of 256,088. If Matrouh has a population of 429,999 and South Sinai has a population of 108,951, how many more people do Matrouh and South Sinai have combined than New Valley?

CONNECT

Writing About Math If you had to teach a friend how to solve multistep story problems, what would you tell them? What strategies would you recommend? What helpful hints would you share?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

3

Theme 1 | Number Sense and Operations

Unit 3

Concepts of Measurement



It's an Ant's Life

Unit Video Questions

Quick Code
egm4027

The video It's an Ant's Life uses measurement to describe the life and work of different types of ants. Omar and Mariam are fascinated by ants and are exploring different types of anthills. They want to use measurement to compare. Because anthills vary greatly in size, they may need help converting measurements between units of length.

- ☐ How big was the biggest ant or anthill you have ever seen?
- ☐ Why would Omar and Mariam need to change units of measure to compare anthills?

LESSON 1
Measuring length

Learning Targets

- I can explain the relationship between metric units of **length**.
- I can **convert** between metric units of length.

ACCESS

Measurement Review Circle the best unit to measure each length.

1.	Height of a student	Kilometer	Meter	Centimeter	Millimeter
2.	Distance between home and school	Kilometer	Meter	Centimeter	Millimeter
3.	Length of the Nile River	Kilometer	Meter	Centimeter	Millimeter
4.	Length of an ant	Kilometer	Meter	Centimeter	Millimeter
5.	Distance from Cairo to Alexandria	Kilometer	Meter	Centimeter	Millimeter

Fill in the blanks to answer the following questions. Think of things that could be measured in each unit.

6. ______________ is best measured in kilometers because ______________.
7. ______________ is best measured in meters because ______________ .
8. ______________ is best measured in centimeters because ______________.
9. ______________ is best measured in millimeters because ______________.

BUILD

Metric Units View and discuss the Metric Conversion chart with your Shoulder Partner.

Kilo-	Hecto-	Deca-	Unit	Deci-	Centi-	Milli-
1,000 units	100 units	10 units	1 unit	$\frac{1}{10}$ unit	$\frac{1}{100}$ unit	$\frac{1}{1,000}$ unit

Work with your Shoulder Partner to fill in the blanks that follow to help you remember the relationship.

1 km = ___________ m   1 m = ___________ cm

Decomposing and Renaming Unit Conversions Fill in the table with proper conversions.

Fill in the table with proper conversions.

	Kilometer	Meter
1		1,000
2	3	
3		40,000

	Meter	Centimeter
4	1	
5		300
6	10	

Look at the following example:

140 cm

1 m	40 cm

Convert the following lengths into the given units in the bar models. Use the previous example to help you.

230 cm

7	________ m	________ cm

478 cm

8	________ m	________ cm

________ cm

9	5 m	91 cm

Answer the story problems. Use your conversion tables to help you.

10. Carpenter ants can be up to 3 centimeters long. A mature colony can have up to 100,000 ants. If the ants lined up end to end and each ant is 1 centimeter long, how many meters long would a line of 100,000 ants be?
11. Using the information from the first item, how many kilometers long would the line of 100,000 ants be?

CONNECT

The Nest When scientists studied the anthill, they found that it was 8 meters deep.

1. How many centimeters would that be? Show your work.

2. The colony had to move tons of soil to construct their nest. The worker ants had to carry loads of soil 1 kilometer to the surface. If one ant carried 10 loads of soil in a week, how many kilometers did it travel while moving soil? How many meters? How many centimeters?

   ______________ km

   ______________ m

   ______________ cm

Photo Credit: (a) Thammanoon Khamchalee / Shutterstock.com, (b) Henrik Larsson / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2
Measuring Mass

Learning Targets
- I can explain the relationship between metric units of **mass**.
- I can convert between metric units of mass.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Convert 7 meters 45 centimeters to centimeters.

Student's answer: 7 m 45 cm = 7,045 cm

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Mass Review Share what you remember about mass. Take turns sharing ideas of objects that would be weighed in grams. Talk to your Shoulder Partner about the similarities between the relationship between mass measurements and the relationship between length measurements from the last lesson.
Fill in the blank to help you remember the relationship and then complete the conversions.

1 ton = ________ kg　　　　1 kg = ________ g

Conversion and Application Look at the following Conversion Example:

2,300 g
1,000 g = 1 kg
2,000 g = 2 kg
+ 300 g

2 kg	300 g

Work with a partner to complete the conversions. Use the previous example to help you.

1. 3 kg = ________ g
2. 8 kg = ________ g
3. ________ kg = 5,000 g
4. 4 kg = ________ g
5. ________ kg = 30,000 g
6. 5 tons = ________ kg

Convert the masses into the units on the bar models.

7. 4,590 g

________ kg	________ g

8. 8,400 g

________ kg	________ g

9. ________ g

7 kg	414 g

10. ________ kg

2 tons	30 kg

Answer each question. Use words, pictures, or numbers to explain your thinking.

11. A colony of black ants is estimated to weigh 3,493 grams. Rewrite that number using kilograms and grams.

12. A different ant colony is estimated to weigh 14 kilograms and 89 grams. Rewrite that weight in grams.

CONNECT

Writing About Math When might you need to convert grams to kilograms or kilograms to grams in your daily life? How do the mental math strategies you have learned help you convert units of measurement? Work independently to respond to the prompt.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3
Units of Capacity

Learning Targets

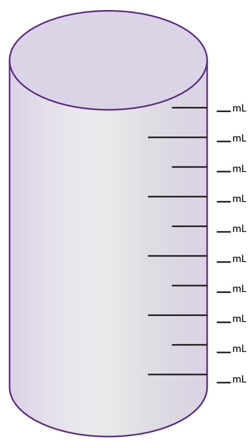
- I can explain the relationship between metric units of **capacity**.
- I can convert between metric units of capacity.

ACCESS

Number Talk Listen to each problem your teacher reads aloud. Use benchmark numbers and the mental math strategies you have learned to solve each one. Be prepared to discuss how you solved each problem.

BUILD

Decomposing and Renaming Fill in the blanks using the cylinder to show how many milliliters it takes to make 1 liter. Then, answer the question.



1 L = ______________________ mL

Work with a partner to solve the problems.

1. 6 L = __________ mL
2. 9 L = __________ mL
3. __________ L = 6,000 mL
4. 3 L = __________ mL
5. __________ L = 10,000 mL

Look at the following Conversion Example:

5,403 mL
1,000 mL = 1 L
5,000 mL = 5 L
+ 403 mL

5 L	403 mL

Using the conversion examples above, convert the following weights into the given units on the bar models.

6. 9,425 mL

________ L	________ mL

7. 6,360 mL

________ L	________ mL

8. ________ mL

8 L	910 mL

Solve each problem.

9. A car is filled with 45 liters of petrol. How many milliliters would that be?

10. Use the recipe that follows to answer the questions.

Sobia Ingredients:

- 100 g raw short grain rice
- 500 mL of water
- 750 mL cold milk
- 100 g caster sugar
- 5 mL vanilla
- 500 mL coconut milk

Which ingredients are measured by mass?

Which ingredients are measured by capacity?

What is the total amount of liquid ingredients in the drink in milliliters? In liters?

Multistep Conversions Solve the problems.

1. A family drank 1 liter 500 milliliters of orange juice at breakfast. If there were 3 liters of orange juice before breakfast, how much orange juice is left?

2. A car was filled with 20 liters 500 milliliters of petrol. At the end of the day, there were 15 liters 250 milliliters left in the tank. How much petrol was used?

3. Doha's fish tank contains
5 liters 245 milliliters of water. If the tank can hold 10 liters of water, how much more water does she need to fill the tank?

CONNECT

Math Language Review Work with your Shoulder Partner to fill in the chart with the measurement units for each form of measurement. Use what you remember from previous grades to complete the time column.

Measurement Terms			
Length	**Mass**	**Volume/Capacity**	**Time**

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Units of Measuring Time

Learning Targets

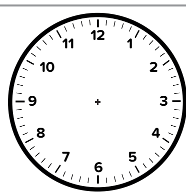
- I can tell time to the minute.
- I can explain relationships between units of time.

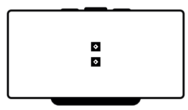
ACCESS

Take out a red and blue crayon to indicate the hour and minute hands.

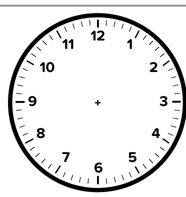
Analog and Digital Clocks Think about three events that happen in your day and the times at which each occurs. Record the event and the time on the analog clock and digital clocks that follow. Use red for the hour hand and blue for the minute hand.

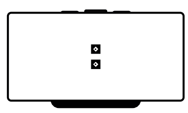
Event 1: ____________________



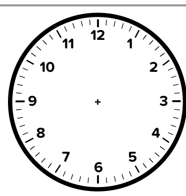


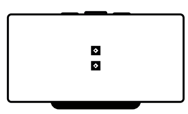
Event 2: ____________________





Event 3: ____________________





BUILD

Brainstorm and name as many units of time as you can. Work with your Shoulder Partner to create a rule for converting units of time.

Ratio Tables Part 1 Work with your teacher and your classmates to fill in Table 1.

Table 1	Minutes	1	2	3	4	5	6	7	8	9	10
	Seconds	60									

Work with your teacher to solve the first three conversions for Tables 2, 3, and 4. Discuss rules for converting. Once answers are reviewed, do a Hands up, Pair Up to find a partner to work with to solve the remaining conversion problems in Tables 2, 3, and 4.

Ratio Tables Part 2 Complete Tables 2, 3, and 4.

Table 2	**Hours**	1	2	3	4	5	6	7	8	9	10
	Minutes	60									

Table 3	**Days**	1	2	3	4	5	6	7	8	9	10
	Hours	24									

Table 4	**Weeks**	1	2	3	4	5	6	7	8	9	10
	Days	7									

Solve the conversion problems using the ratio tables above.

5. 10 hours 30 minutes = ____________ minutes
6. 6 minutes 15 seconds = ____________ seconds
7. 4 days 20 hours = ____________ hours

CONNECT

How Hard Do Ants Work? Answer the questions and show your work.

The average worker ant works about 19 hours per day. Worker ants can lift over 100 times their own body weight and they do that hundreds of times every day. They can move pretty quickly at about 3 centimeters per second, so they cover a lot of ground each day. If we were to translate that data to a human adult, that person would have to carry a 22-kilogram weight 60 kilometers every day. Could you do that on only 5 hours of sleep a night?

1. An average ant works for 19 hours a day. How many hours does an ant work in 3 days?
2. A worker ant takes 240 naps a day. Each nap lasts 1 minute. About how many hours did the nap ant?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5
Elapsed Time

Learning Targets

- I can explain **elapsed time**.
- I can solve elapsed time problems.
- I can explain the strategies I use to solve elapsed time problems.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

It takes Dalia 2 hours and 15 minutes to drive to her grandmother's house.
How many minutes does the drive take?

Student's work: 2 x 6 = 12 12 + 15 = 27 It took 27 minutes.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Passage of Time Read the problem in the box silently. How is this problem different from the time problems you solved in the last math lesson? Be prepared to discuss.

> Farah was training for a marathon. Her goal was to run for 1 hour and 30 minutes. If she started running at 8:35 a.m., what time did she finish running?

After sharing your thinking with the class, work with a partner to solve the story problem.

Solving Elapsed Time Problems Solve the problems and write the new time. Based on the examples shown to you by your teacher, try a few different strategies to solve the problems. Show your work.

1. 3:25 + 1:26 = __________
2. 3:25 + 45 minutes = __________
3. 5:43 – 1:25 minutes = __________
4. Jana and Maha have 5 hours to watch three movies that last 1 hour and 22 minutes; 2 hours and 12 minutes; and 1 hour and 57 minutes.

   Do the girls have enough time to watch all three movies? How do you know?

   The girls decide to just watch the two shortest movies. If they start watching them at 5:30 p.m., what time will their movies end?

5. A worker ant went out to find food for the colony. It left at 6:30 a.m. and returned at 7:42 a.m. How long was that ant looking for food?

CONNECT

Origins of Telling Time Read the following article about why time is measured in groups of 12 and 60. Be prepared to share your thoughts about what you read.

why are there 12 hours in the morning and 12 hours in the afternoon and 60 minutes in an hour and 60 seconds in a minute? Why not use a Base 10 system?

The answer lies in those ancient civilizations.The Sumerians used a system of 12 and 60 starting in 3,500 B.C. However, why Base 12 and Base 60? The reason actually comes from the structure of our fingers.

The number of joints on each hand, minus the thumb, makes it possible to count to 12 by using the thumb.

The division of an hour into 60 minutes and 60 seconds was determined by astronomers using the Base 60 system of the Babylonians. So our units of time, which can seem so confusing, are linked to the first civilizations and our own hands.

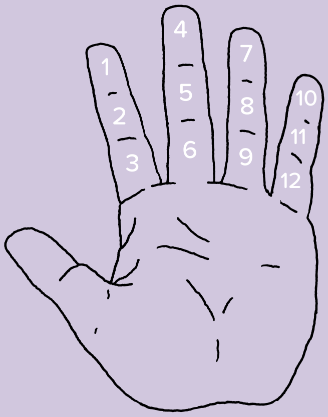


Photo Credit: Elizaveta Galitckaia / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Applications of measurement 1

Learning Targets

- I can add and subtract to solve measurement problems.
- I can solve story problems involving measurement.
- I can apply a variety of strategies to solve story problems.

ACCESS

Take Steps to Solve Problems Use the Steps for Solving Story Problems to solve the problem.

In Colony A, the ants collect 950 grams of food. If they consume 25 grams of food on Monday and 37 grams of food on Tuesday, how many grams of food are left?

BUILD

So Many Strategies Record your favorite and least favorite problem-solving strategy.

The problem-solving strategy that works best for me is

____

because ______________________________________.

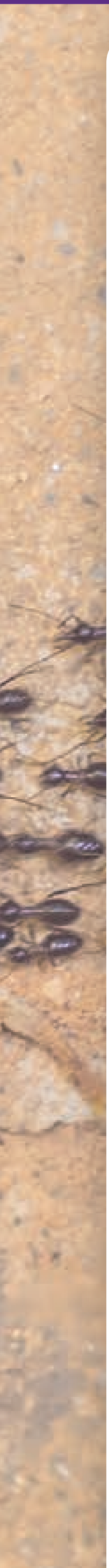
The problem-solving strategy I use the least is

____

because ______________________________________.

Solve as many problems as you can. Use at least three different problem-solving strategies (you may not finish them all, so choose the ones you want to try first). Use the Steps for Solving Story Problems, if that is helpful. Be sure to label your answers.

1. The potatoes Aya bought weighed 2 kilograms 920 grams. Her onions weighed 1,075 grams less than the potatoes. How much did the potatoes and onions weigh together?



2. A pharaoh ant grows from egg to adult in 45 days. A carpenter ant grows from egg to adult in 12 weeks. Which species takes longer to grow from egg to adult? How much longer?

3. A fish tank with a capacity of 100 liters is filled with 20,000 milliliters of water. How many more liters of water are needed to fill it up completely?

4. Zeina purchased 8 kilograms of sugar, 10 kilograms of flour, 500 grams of cocoa, 225 grams of pecans, and 275 grams of coconut. What is the total mass of her groceries in kilograms?

5. Taher grew 10 centimeters in 1 year. He is now 1 meter 6 centimeters tall. How many centimeters tall was Taher 1 year ago?

6. An ant from Colony A walked 2 kilometers in a day. An ant from Colony B walked 3,000 meters in a day. Which ant walked the farthest and how much farther in kilometers did it walk?

7. Ali’s cat weighs 7 kilograms and his dog weighs 17 kilograms. When Ali took them to the vet, he learned that his cat gained 450 grams and his dog gained 120 grams. How much do his two pets weigh in all now?

8. Mr. Emad bought four 2-liter bottles of soda for the Primary 4 picnic. If there were 2 liters and 829 milliliters of soda remaining at the end of the party, how many milliliters of soda did the students drink?

9. Worker ants take power naps totaling up to 250 minutes a day. A queen ant may sleep up to 9 hours a day. Which ant sleeps longer and by how many minutes?

10. Rania is measuring two ant lines. Colony A's ant line is 30 centimeters long, and Colony B's ant line is 500 millimeters long. How many centimeters long are the two ant lines together?

CONNECT

Writing About Math Choose one of the BUILD problems. Explain how you solved the problem, why you chose the strategy you used, and how you know your answer is correct.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7
Applications of measurement 2

Learning Targets

- I can multiply and divide to solve measurement problems.
- I can solve story problems involving measurement.
- I can apply a variety of strategies to solve story problems.

ACCESS

Ant Math Solve the problem and explain your solution with words, numbers, a drawing, or a table.

An ant is at the bottom of a 20-meter deep well and is trying to get to the top. Each day he climbs 4 meters up, but each night he slides back 2 meters. How many days does it take for him to get out of the well?

BUILD

Multistep Measurement Work with a partner to solve the problem using the "Draw a picture or model" strategy. Be prepared to discuss your thinking.

Ahmed has a 12-meter-long piece of wood. He wants to cut it into 3 equal lengths. How long should each cut piece be in meters? How long will each of these pieces be in centimeters?

Jigsaw Work with your Home Team small group to solve the problem assigned to you by your teacher. Be ready to share your strategy with others.

Circle your assigned team number. 1 2 3 4

1. Ayman is a runner. While Ayman is in training, he needs to drink 500 milliliters of water 4 times per day. How many liters of water will that be for 1 week?

2. Ehab is a weightlifter. He has a mass of 100 kilograms. His aim is to gain 500 grams per week. If he does that for 5 weeks, what will his mass be at the end?

3. Amany is a swimmer. She spends half an hour every day swimming. How many minutes in total does she swim for during a 5-day period?

4. Sara travelled 9 days continuously. She travelled 5,000 meters each day. How many kilometers did she walk in all?

CONNECT

Ants Are Amazing solve the problem. Show your work.

Mariam was having a picnic with her family and counted 10 ants walking by. If each ant weighed 1 gram and carried 50 times its body weight, how much weight was being carried in all?

Check Your Understanding

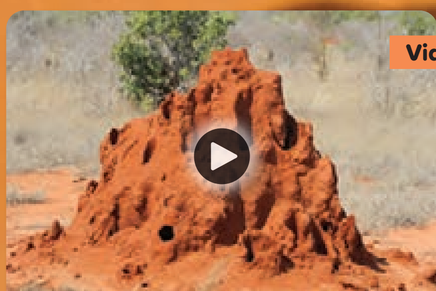
Follow your teacher's instructions to complete this activity.

UNIT

4

Theme 1 | Number Sense and Operations

Unit 4
Area and Perimeter



Hungry Ants

Unit Video Questions

Omar and Mariam are observing a group of worker ants in the park. When ants leave the colony, they can travel long distances. To study the ants, Omar and Mariam decide to only observe the ants while they are in a certain space. They may need some help creating boundaries for this space.

Quick Code
egm4083

- ☐ What shape should Omar and Mariam make their observation space?
- ☐ Why do worker ants travel long distances away from their colony?
- ☐ Can the ants be contained in the space Omar and Mariam create?

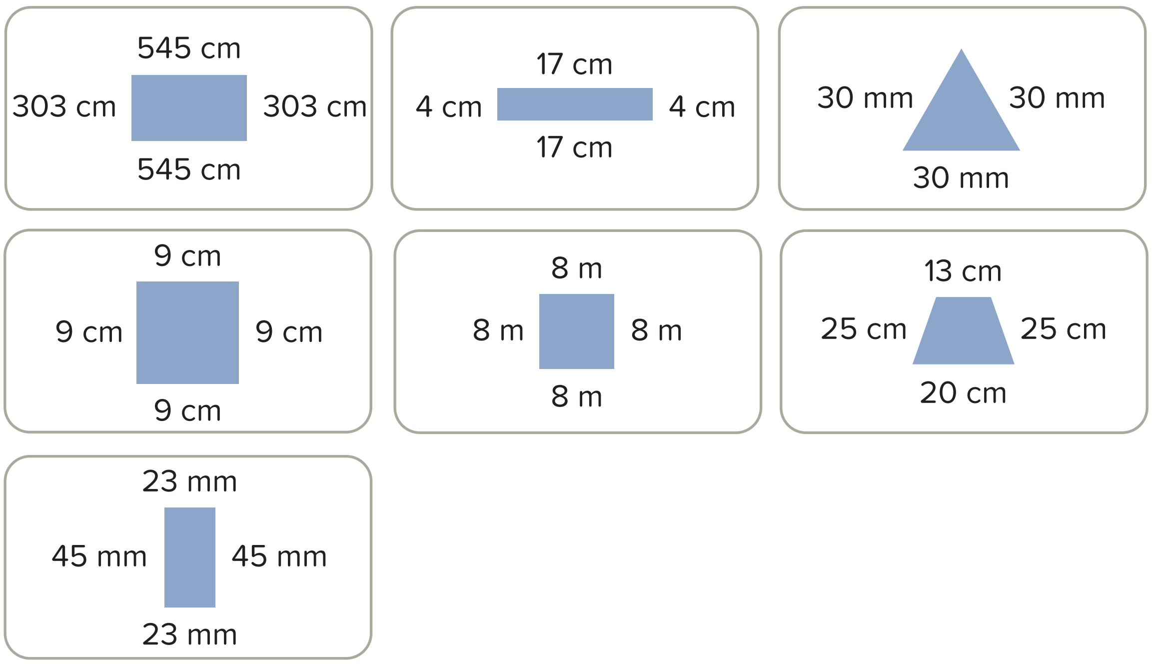
LESSON 1
Finding perimeter

Learning Targets

- I can define **perimeter**.
- I can use **formulas** to calculate the perimeter of rectangles.
- I can explain how to calculate perimeter.

ACCESS

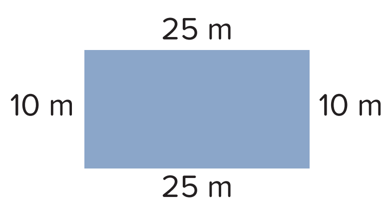
Rectangle Review Compare the shapes in the boxes. Highlight or circle all of the rectangles and place a star on the squares.



BUILD

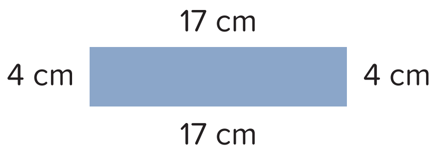
Marching Ant Addition Solve the problems. Show your work.

1. A group of worker ants are in search of food. They secrete pheromones (chemicals) to lay a scent trail. They follow each other in a line around a building. Using the model that follows, what is the perimeter of the building?

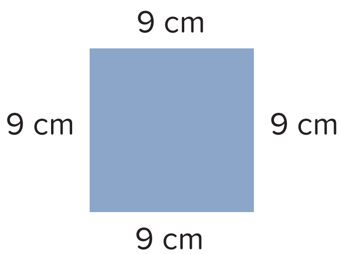


2. Work with your partner to write a rule or formula to help mathematicians efficiently solve perimeter problems.

3. Use $P = l + w + l + w$ or $P = (l + w) \times 2$ to calculate the perimeter of the shapes. Show your work.

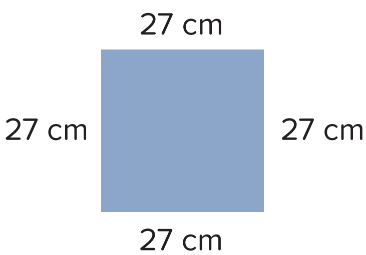


4. Use $P = l + w + l + w$ or $P = (l + w) \times 2$ to calculate the perimeter of the shapes. Show your work.



Foraging for Formulas Calculate the perimeter of the shapes that follow. Use two different formulas to solve each problem. Show your work.

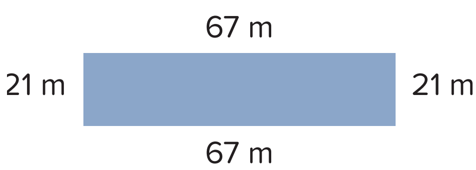
1.



Formula 1: ______________________________

Formula 2: ______________________________

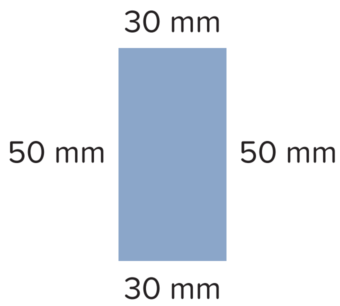
2.



Formula 1: ______________________________

Formula 2: ______________________________

3.



Formula 1: ______________________

Formula 2: ______________________

Solve the following perimeter problems. For each problem, sketch a rectangle and record the length and width according to the problem.

4. Sarah is putting a border around the edge of a square cake. One side of the cake is 30 centimeters long. How long will the border of Sarah's cake be?

5. A soccer team is roping off part of a field to play soccer. To have enough room for a large crowd, they need a space that is 105 meters long by 68 meters wide. How much rope will they need for this part of the field?

CONNECT

Carpenter March Solve the perimeter problem. Show your work.

A carpenter ant walked a perimeter of 100 centimeters. Draw two different rectangles that could represent its walk.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Finding area

Learning Targets

- I can define **area**.
- I can use formulas to calculate the area of rectangles.
- I can explain how to calculate area.

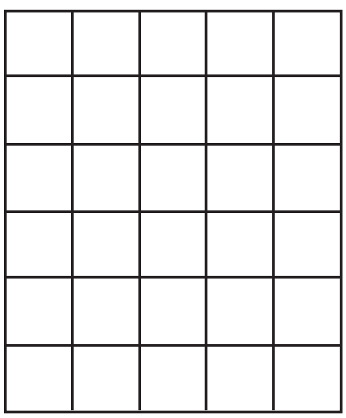
ACCESS

Number Talk Describe the strategy (or strategies) you used to solve the addition problems mentally.

BUILD

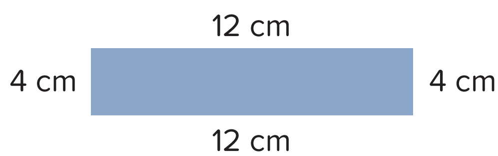
Area Review Determine the area of the rectangles. Show your work.

1.



Area = ____________

2.



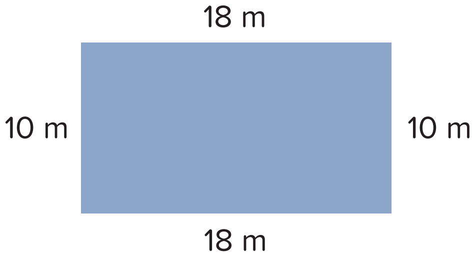
Area = ____________

3. Create a formula for finding the area of a rectangle.

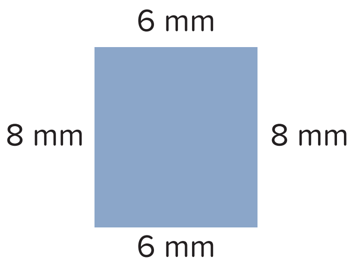
4. Could you use your formula to find the area of a square? Sketch a square and show your thinking.

Area Practice Solve the problems. By using: A = L x W.

1. Find the area.



2. Find the area.



3. A glass company is cutting a piece of glass to cover the top of a banquet table. The table measures 8 meters by 6 meters. What is the area of the glass needed for the table?

4. A small rectangular ant farm measures 20 centimeters by 8 centimeters. What is the area of the ant farm?

   What is the measurement of the glass? Should you calculate area or perimeter to find that measurement?

CONNECT

Carpet Tile Solve the problem. Show your work.

You have 36 square carpet tiles to arrange on the floor in the shape of a rectangle. Draw two possible arrangements and label the length and width. What is the perimeter of each arrangement? What is the area?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Unknown Dimensions

Learning Target

- I can use formulas to calculate **unknowns** when given some **dimensions** of rectangles.

ACCESS

Error Analysis Analyze the student's work and answer that follow. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Amir is a myrmecologist who found a large fire ant mound. He placed string around the outside of the mound in a rectangular shape so that he could study the mound safely. The width of the rectangle was 8 meters and the length of the rectangle was 12 meters. How many square meters are roped off to study?

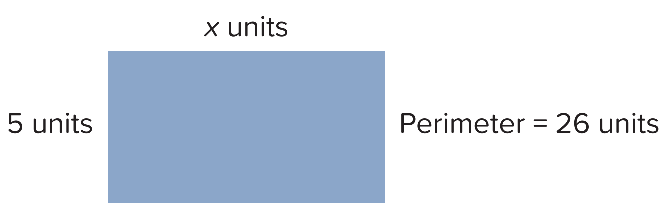
Student's Solution:

There are 40 meters of ground to study. 8 + 8 + 12 + 12 = 40.

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly and explain your thinking.

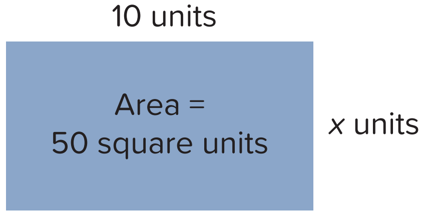
BUILD

Mystery Dimension Work with a partner to answer the questions about the rectangles.



1. What is known about this rectangle?
2. What is unknown about this rectangle?

3. How can we use the perimeter to help find the missing dimension? What is the missing dimension?



4. What is known about this rectangle?
5. What is unknown about this rectangle?
6. How can we use the area to help find the missing dimension? What is the missing dimension?

SCOOT Your task is to solve as many perimeter and area problems as you can with your partner. Show your work in the box that matches the card number. When you finish a card, solve another one.

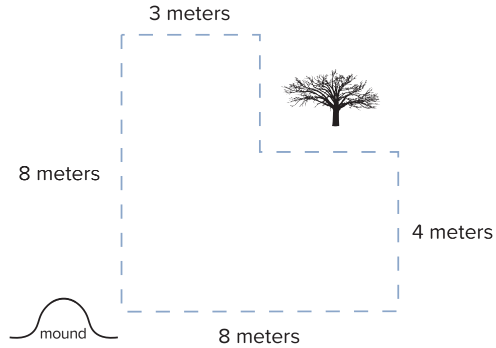
SCOOT Recording Sheet

1	2	3	4
5	6	7	8
9	10	11	12

CONNECT

Compound Shape Challenge Read the problem and solve to find the perimeter. Then, take the challenge and find the area.

Some fire ants left the mound to go look for food. They went 8 meters east from the mound and then turned and walked 4 meters north. They came to a big tree so they walked around it. When they passed the tree, they turned west for 3 more meters and then headed south 8 meters back home. See their path in the diagram. Label the missing measurements.



How many meters in total did they walk? What is the area of the shape?

Perimeter = ______________________

Area = ______________________

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4
Complex Shapes

Learning Targets

- I can find the area and perimeter of **complex** shapes.
- I can explain my strategy for finding the area and perimeter of complex shapes.

ACCESS

HANDS-ON ACTIVITY

Making Crazy Shapes

Follow your teacher's instructions.

1. Calculate the perimeter and area of the shape your teacher gave you. Record your calculations. Then, at your teacher's direction, cut out your shape along its perimeter.

   Shape ______________________________

   Perimeter = ______________________________

   Area = ______________________________

2. Work with your partner to create a new shape. Make sure that two sides touch. Trace the new shape.

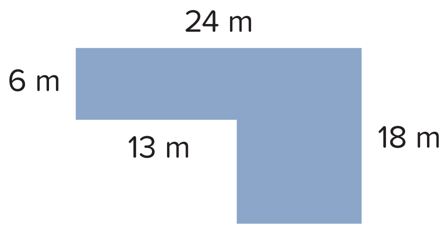
   New Shape:

3. Talk with your partner about how you would find the new shape's area and perimeter. Record your thinking. (Do not find it yet. Just come up with a strategy.)

BUILD

Calculating Crazy Shapes Solve each problem.

1. Divide this shape into smaller rectangles or squares. Then, calculate its area and perimeter. Show your work.



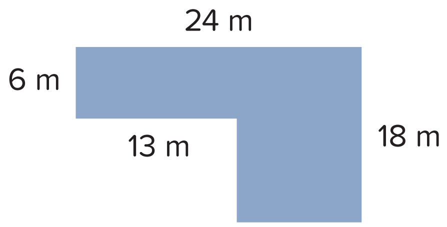
Area = ______________________________

____

____

Perimeter = ______________________________

2. Divide the shape in a different way and calculate its area and perimeter. Show your work.



Area = ______________________________

Perimeter = ______________________________

3. What do you notice?

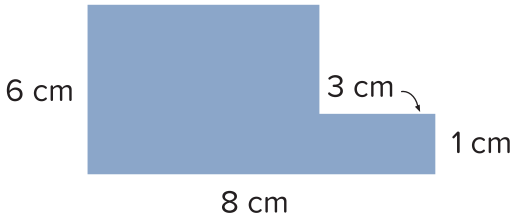
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____

____

Calculate the area and perimeter of the complex shapes. Show your work.

4.



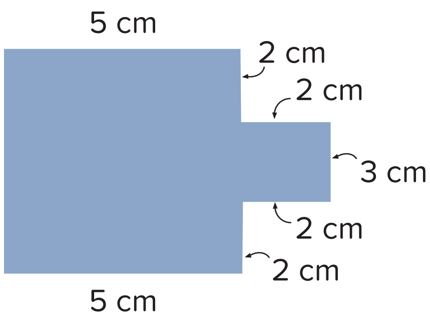
Area = ____________________

____

____

Perimeter = ____________________

5.



Area = ____________________

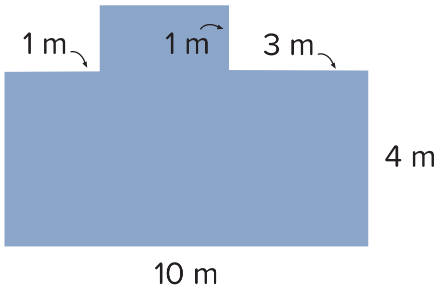
____

____

Perimeter = ____________________

____

6.



Area = ______________________________

____

____

Perimeter = ______________________________

7. Calculate the area and perimeter of the complex shape you created in ACCESS.

Area = ______________________________

Perimeter = ______________________________

Challenge: Design your own complex shape and calculate its area and perimeter.

CONNECT

Writing About Math Read and solve the problem.

What do you think is the easiest part of calculating the area and perimeter of complex shapes? What do you think is the most challenging part of calculating the area and perimeter of complex shapes?

Check Your Understanding

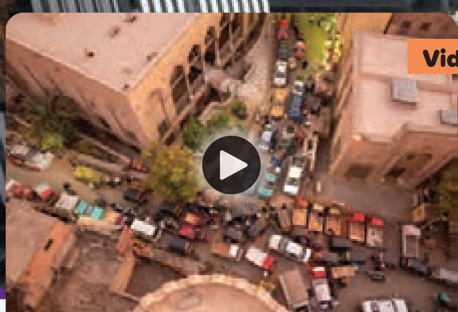
Follow your teacher's instructions to complete this activity.

UNIT

5

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 5 Multiplication as a Relationship



Multiplication Moments

Unit Video Questions

Quick Code egm4061

The video Multiplication Moments encourages the use of multiplication to calculate the number of people who travel by different modes of transportation. Omar and Mariam are investigating and comparing numbers of people who travel on different types of transportation.

- [ ] How can they use multiplication instead of addition to calculate large quantities?

LESSON 1
Multiplicative Comparison

Learning Targets

- I can define **multiplicative comparison**.
- I can explain how multiplication can be used to compare numbers.
- I can create models to show multiplicative comparisons.

ACCESS


Unfastened Seat Belt Straps

Seat Belt Safety Have you ever wondered how much safer you are in a car when you wear a seat belt? Your teacher will give you a strip of paper. Compare your strip of paper to your teacher's strip of paper. Then estimate:

- How many times could your strip fit on your teacher's strip?
- How many times could you and your partner's strip laid end-to-end fit on your teacher's strip?
- How many times could four or five strips laid end-to-end fit on your teacher's strip?



Photo Credit: Ossamaabdelbary / Shutterstock.com

BUILD

HANDS-ON ACTIVITY

Visualizing Multiplicative Comparison with Diagrams

Work with your teacher to model comparisons. Cut apart the tapes given to you by your teacher and glue them end-to-end to create tape diagrams. Label each tape. Then, complete the comparison statements.

1. Compare 10 and 2. 10 is ______ times greater than 2.
2. Compare 12 and 3. 12 is ______ times greater than 3.
3. Compare 18 and 6. 18 is ______ times greater than 6.

Multiplicative Comparison with Numbers Use tape diagrams or multiplication facts to compare the numbers. Be sure to show your work for each problem.

1. Compare 15 and 3. 15 is ______ times greater than 3.
2. Compare 28 and 7. 28 is ______ times greater than 7.
3. Compare 27 and 9. 27 is ______ times greater than 9.

CONNECT


Fastened Seat Belt Straps

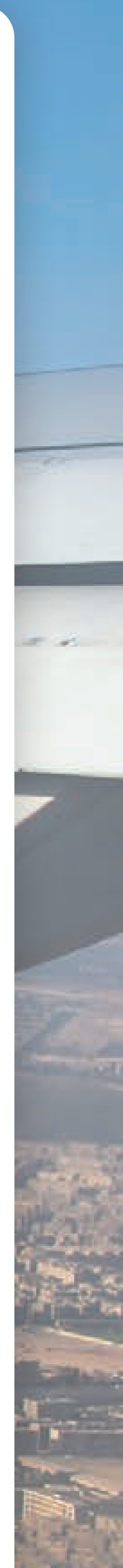
Photo Credit: Ossamaabdelbary / Shutterstock.com

Writing About Math Respond to the questions. Use numbers and words to explain your thinking.

- How do multiplicative comparisons help us understand how much safer it is to wear a seatbelt?
- How can we use multiplicative comparisons to help us understand and describe the world around us?

Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 2

Creating Multiplicative Comparison Equations

Learning Targets

- I can create multiplication equations to represent comparisons.
- I can use a letter to represent a missing number in a multiplication problem.

ACCESS

Comparing Transportation Speeds Read the infographic. Highlight or circle phrases that show multiplicative comparison.

Photo Credit: Ossamaabdelbary / Shutterstock.com

A sailboat travels about 2 times faster than a person walking.

A bicycle travels 3 to 4 times faster than a sailboat.

A cruise ship travels about the same speed as a fast bicycle and about 8 times the speed of a person walking.

A car travels about 20 times faster than a person walking and more than twice as fast as a cruise ship.

High-speed trains move 8 times faster than a cruise ship and over 30 times as fast as a sailboat.

Passenger airplanes travel nearly 200 times faster than a person walking, but more than twice as fast as a high-speed train.

BUILD

Multiplying to Show Comparisons Write an equation based on the comparison statement. Use a letter to represent the unknown number. You do not have to solve the equations.

1. 4 times greater than 3 is ____________________
2. 18 is 6 times as many as ____________________
3. 2 times greater than 7 is ____________________
4. 24 is 4 times as great as ____________________
5. 25 is 5 times as many as ____________________

Creating Equations for Multiplicative Comparisons Work with a partner to complete this activity. Read the story problems. Think about the comparisons being expressed in the story. Then, write a multiplication equation based on the story problem. Use a letter to represent the unknown number. You do not have to solve the equations.

1. Nadia collected 5 marbles in March. By May she had 4 times as many marbles. How many marbles does Nadia have in May?

   ____

2. Hamed had 12 cookies, which was 3 times as many cookies as his brother, Ahmed. How many cookies did Ahmed have?

   ____

3. It took Aida 21 minutes to walk to school on Monday. On Tuesday, it took her 7 minutes to ride her bike to school. How many times faster was riding her bike than walking?

   ____

CONNECT

Exit Ticket Imagine a car is 3 times faster than a bicycle. It takes Salma 24 minutes to get to school by bicycle. Write a multiplication equation that shows how long it would take Salma to get to school by car. Use a letter to represent the unknown number. Use words, numbers, or pictures to explain your thinking. You do not have to solve the equation.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3
Solving Multiplicative Comparison Equations

Learning Target

- I can solve a multiplication equation that represents a comparison.

ACCESS

Different Ways of Solving Read the problem and decide whether you agree or disagree with Moustafa.

Moustafa is solving the equation 6 x a = 18. He says that he can solve the problem by doing 18 ÷ 6 = a. Do you agree or disagree with Moustafa? Why? Use words, numbers, and pictures to explain your thinking.

BUILD

How Many Seats? Use the information in the table to compare numbers of seats in different modes of transportation. Then, enter and solve an equation for each comparison.

Mode of Transportation	Number of Seats
Bicycle	1
Motorbike	2
Car	4
Truck	6
Bus	36
Metro Train	48

Photo Credit: Ossamaabdelbary / Shutterstock.com

1. How many times as many seats are in a truck than on a motorbike?

   Equation: ______________________

   Answer: ______________________

2. How many times as many seats are on a bus than in a truck?

   Equation: ______________________

   Answer: ______________________

3. How many times as many seats are on the metro train than in a car?

   Equation: ______________________

   Answer: ______________________

4. A metro train can fit how many times more people than a truck?

   Equation: ______________________

   Answer: ______________________

5. A bus has how many times more seats than a car?

   Equation: ______________________

   Answer: ______________________

CONNECT

More Seats to Sail A boat has 12 seats. Write your own problem comparing the number of seats on a boat to another mode of transportation in the table in BUILD. Write and solve an equation for your comparison.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4
Commutative Property of Multiplication

Learning Targets

- I can explain the **Commutative Property of Multiplication**.
- I can apply the Commutative Property of Multiplication to solve problems with and without an unknown number.

ACCESS

Toy Car Number Talk Solve the problem. Give the teacher a Thumbs-Up when you are finished.

Ahmed has 48 toy cars and wants to display them in his room. He wants to arrange them in equal rows and equal columns. How can he display his cars? Draw your solution.

BUILD

Exploring the Commutative Property of Multiplication Turn and talk about what you remember about the Commutative Property of Multiplication.

Write a definition for the Commutative Property of Multiplication in your own words. Include an example.

HANDS-ON ACTIVITY

Arrays and the Commutative Property

1. Take out your digit cards (1–9). Choose 2 digit cards. Draw an array using the numbers you chose as factors (numbers of rows and columns). Then, use the same numbers to draw a new array. Write an equation for your arrays using the Commutative Property of Multiplication.

HANDS-ON ACTIVITY

Arrays and the Commutative Property

2. Repeat the activity until time is up. There is space for you to write 5 array equations.

Array Equation 1: _______ x _______ = _______ x _______

Array Equation 2: _______ x _______ = _______ x _______

Array Equation 3: _______ x _______ = _______ x _______

Array Equation 4: _______ x _______ = _______ x _______

Array Equation 5: _______ x _______ = _______ x _______

CONNECT

Writing About Math Read and solve the problem.
There are 42 people who want to play football. Badr says that you can make 6 teams with 7 people on each team. Salma says you can make 7 teams with 6 people on each team. Who is correct? Use numbers, words, and pictures to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Identity Property and the Zero Property

Learning Targets

- I can explain the **Identity Property** and the **Zero Property of Multiplication**.
- I can apply the Identity and Zero Properties of Multiplication to solve problems.
- I can identify patterns I observe when multiplying by 10, 100, and 1,000.

ACCESS

Mental Math Number Talk Look at the problems below. Solve them mentally (without writing anything down).

1. 5 x 1	2. 12 x 1	3. 672 x 1
4. 8 x 0	5. 16 x 0	6. 758 x 0

Write a definition for the properties in your own words. Write an example of each using numbers and symbols.

Property	Definition and Example
Identity Property of Multiplication	
Zero Property of Multiplication	

BUILD

Mental Math Multiplication Read the problem. What do you notice about the problem? What numbers do you think belong in the blanks? Why do you think so?

The metro can get people around the city ________ times as fast

as walking. If the average person walks ________ kilometers an hour, about how fast does the metro go?

Place Value Patterns Talk with a partner about the multiplication problems. Draw place value models to solve the problems. Look for patterns while solving and record your observations.

1 x 4 = ________ 10 x 4 = ________

100 x 4 = ________ 1,000 x 4 = ________

Thousands	Ones		
Ones	Hundreds	Tens	Ones

Describe the patterns you observe in the problems and their solutions.

CONNECT

Writing About Math Tarek says that 9 x 1,000 equals 900. What would you tell Tarek to help correct his mathematical thinking? Use words, numbers, or pictures to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

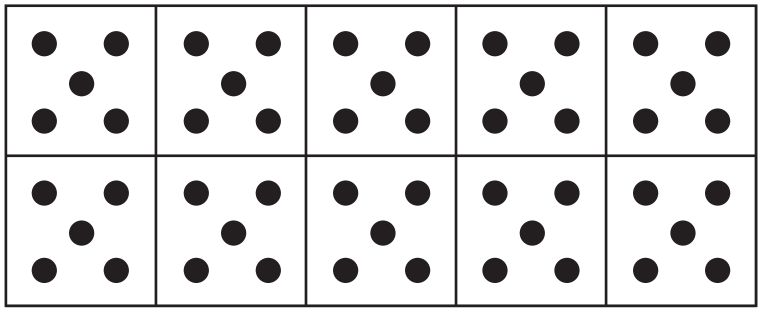
Associative Property of Multiplication

Learning Targets

- I can explain the **Associative Property of Multiplication**.
- I can apply the Associative Property of Multiplication to solve problems.

ACCESS

Dot Card Number Talk Look at the image. How many dots do you see in the image below? How did you come up with your answer?



BUILD

Uncovering the Associative Property of Multiplication Solve the problem assigned by your teacher.

Problem 1: 3 x 2 x 4 = ______

Problem 2: 4 x 2 x 3 = ______

Applying the Associative Property of Multiplication Work with a partner to solve the problems. Place parentheses around the factors that you will multiply first. Rewrite the factors in another order if helpful.

1. 3 x 2 x 5 = ______
2. 4 x 6 x 2 = ______
3. 2 x 9 x 3 = ______
4. 3 x 2 x 3 = ______
5. 4 x 3 x 7 = ______
6. 4 x 5 x 6 = ______

7. 2 x 5 x 8 = ______

8. 3 x 4 x 5 = ______

9. 3 x 3 x 7 = ______

10. 2 x 2 x 9 = ______

CONNECT

Writing About Math Use what you have learned about the Associative Property of Multiplication to help Farouk solve the problem. Use words and numbers to explain your thinking.

Farouk is trying to solve the problem 2 x 7 x 4.

He starts by solving 2 x 7 and gets 14. Place parentheses to show how Farouk started this problem.

2 x 7 x 4

Next, he writes 14 x 4, but he does not know how to solve that multiplication problem. Can you show Farouk another way to solve the problem?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

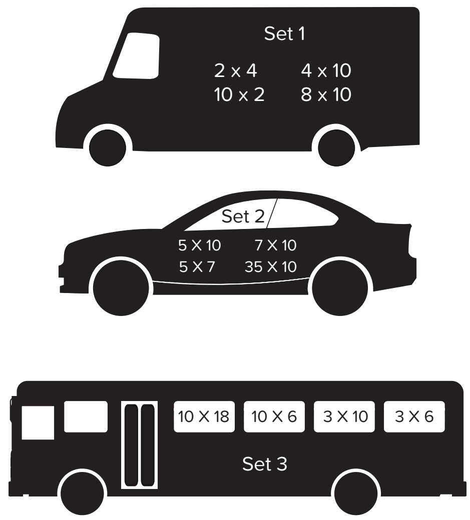
Applying Patterns in Multiplication

Learning Target

- I can use **decomposing** and the Associative Property of Multiplication to solve equations with multiples of 10, 100, or 1,000.

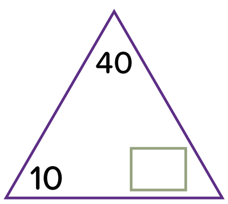
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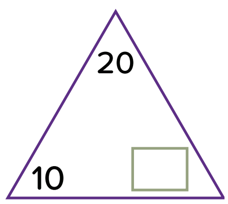
Review Multiplying by 10 Look at Set 1. Solve each problem mentally. Think about any connections or patterns you notice in each set of problems.

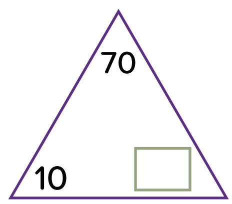


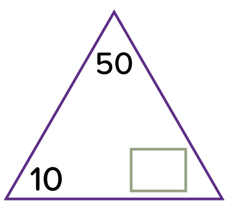
BUILD

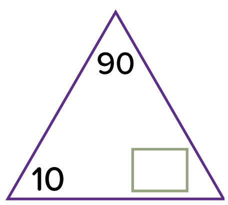
Decomposing Multiples of 10 Decompose each number into a factor pair with 10. Write the missing factor in the box.

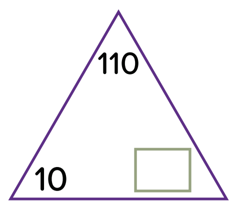
1. 

2. 

3. 

4. 

5. 

6. 

Write how many Tens make up each number.

7. 30 = ______ Tens

8. 80 = ______ Tens

9. 160 = ______ Tens

10. 140 = ______ Tens

11. 120 = ______ Tens

12. 110 = ______ Tens

Multiplying by Multiples 10, 100, and 1,000 Use decomposing and the Associative Property of Multiplication to solve each problem.

Example: 7 x 20 = ______________________________

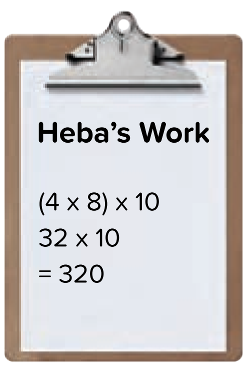
1. 5 x 50 = ______________________________

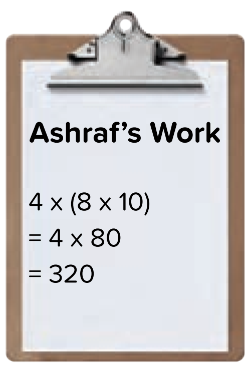
2. 4 x 700 = ______________________________

3. 3 x 4,000 = ______________________________

CONNECT

Writing About Math Review each student's work. Then, answer the questions.





How is Heba's and Ashraf's work the same? How are they different? Which student's strategy do you prefer? Why?

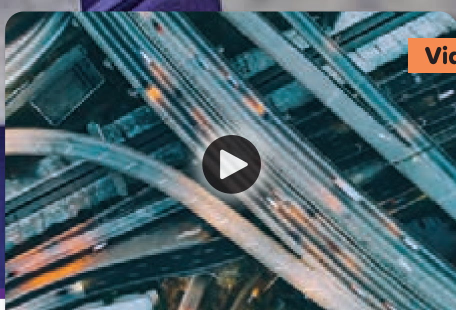
Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT
6

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 6
Factors and Multiples



Freeway Factors

Unit Video Questions

Omar and Mariam are helping their teacher plan a school trip. To determine which type of transportation the school should use for the trip, they will use their understanding of multiplication facts. But they may need help assigning students to seats.

Quick Code
egm4073

- ☐ What are the different ways seats can be arranged?
- ☐ How would you arrange the students in your class for a field trip?

LESSON 1

Identifying Factors of Whole Numbers

Learning Targets

- I can define **factors** of a whole number.
- I can identify factors of a whole number.
- I can explain patterns I observe in numbers that have 2, 5, or 10 as a factor.

ACCESS

Lots of Rectangles There are 24 seats on an airplane arranged in a rectangle. Each of your counters represents one seat. Use all of your counters to create as many seating arrangements as you can. Draw your rectangles and label the dimensions (width and height).

BUILD

Numbers with Factors of 2, 5, and 10

Count by 2s. Shade the numbers that you say as you count.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Count by 5s. Shade the numbers that you say as you count.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Count by 10s. Shade the numbers that you say as you count.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Determine if the given number has 2 as a factor, 5 as a factor, or 10 as a factor. Circle yes or no.

	Number	Is 2 a factor?	Is 5 a factor?	Is 10 a factor?
1	26	Yes No	Yes No	Yes No
2	70	Yes No	Yes No	Yes No
3	15	Yes No	Yes No	Yes No
4	17	Yes No	Yes No	Yes No

Finding Factor Pairs Work with your teacher to create a factor rainbow and T-chart for 40.

1. List the factors of 40.

   Factor Rainbow **T-Chart**

2. List the factors of 36. There are 5 factor pairs.

   Factor Rainbow **T-Chart**

3. List the factors of 20. There are 3 factor pairs.

   Factor Rainbow **T-Chart**

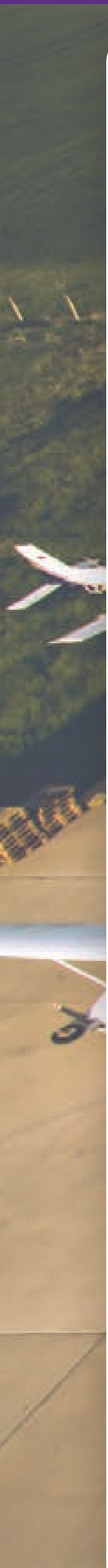
CONNECT

Writing About Math Write three numbers that have 2, 5, and 10 as factors. What do the three numbers you wrote have in common?

Check Your Understanding

Follow your teacher's instructions to complete this activity.





LESSON 2

Prime and Composite Numbers

Learning Targets

- I can identify factors of a whole number.
- I can explain patterns I observe in numbers that have 3, 6, or 9 as factors.
- I can determine if a number is **prime** or **composite**.

ACCESS

Factor Riddles Listen to the riddles read by your teacher. Solve the riddles and record your answers.

1. The number is an even number between 20 and 30. Some of its factors include 1, 2, 4, 7, and 14. What number is it?

   ____

2. The number is an even number greater than 40. It has 10 as a factor. It is less than 60. What number is it?

   ____

3. The number is a two-digit number. It has 5 as a factor. Its Tens digit is less than its Ones digit. One of its factor pairs is 5 and 7. What number is it?

   ____

BUILD

Numbers with Factors of 3, 6, or 9 Determine if each number has 3, 6, or 9 as a factor. Explore these patterns:

- A number has 3 as a factor if the sum of the digits is a number that is said when skip counting by 3.

  Example: 63 has 3 as a factor because 6 + 3 = 9 and 9 is a number we say when we skip count by 3s.

- A number has 9 as a factor if the sum of the digits is a number that is said when skip counting by 9s.

  Example: 72 has 9 as a factor because 7 + 2 = 9 and 9 is a number we say when we skip count by 9s.

- A number has 6 as a factor if it has both a factor of 2 and a factor 3. This means it has to be even and the sum of the digits have to be a number said when skip counting by 3s.

  Example: 36 has 6 as a factor because it is even and because 3 + 6 = 9 and 9 is a number we say when we skip count by 3s.

Use these patterns to solve the problems.

1. Is 3 a factor of 53? How do you know?

2. Is 9 a factor of 63? How do you know?

3. Is 6 a factor of 84? How do you know?

Prime or Composite List all of the factors of each number. Then, write whether the number is prime or composite.

A prime number has exactly two factors: 1 and the number itself.

A composite number has more than two factors.

Prime or Composite?

1. 18 ______________________

2. 21 ______________________

3. 31 ______________________

4. 44 ______________________

5. 23 ______________________

Prime Numbers Less than 100 Identify all of the prime numbers less than 100. Use skip counting and factor patterns to help you eliminate composite numbers.

1. Circle 2 and cross out all other numbers that you say when you skip count by 2s.
2. Circle 3 and cross out all other numbers that you say when you skip count by 3s.
3. Circle 5 and cross out all other numbers that you say when you skip count by 5s (some are already crossed out).
4. Circle 7 and cross out all other numbers that you say when you skip count by 7s.
5. Circle all numbers that remain except for 1.

When you are finished, the circled numbers are prime and the crossed out numbers are composite.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

CONNECT

Writing About Math The seats on the new ferry will be arranged in a rectangle. Is it better for the ferry to have 48 seats or 53 seats? How do you know? Would 49 seats be a good idea? Use numbers, words, and pictures to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Greatest Common Factor G.C.F

Learning Targets

- I can find **common factors** between two whole numbers.
- I can identify the **greatest common factor** between two whole numbers.

ACCESS

Math Fluency Sprint Your teacher will assign you a multiplication facts review activity. Answer as many problems as you can in 60 seconds.

BUILD

Common Factors List the factors of each number. Highlight or circle the common factors of each pair of numbers.

1. 36 and 42

2. 18 and 4

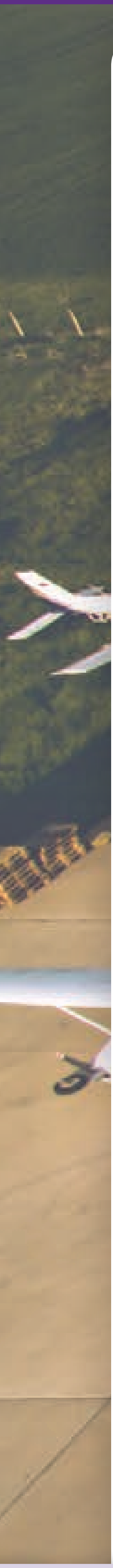
3. 20 and 30

4. 21 and 35

5. 17 and 22

Finding the Greatest Common Factor Use what you know about factors and common factors to solve each problem.

1. A class is going on a field trip. There are 36 girls and 27 boys in the class. Students will be divided into groups of girls and groups of boys. What is the greatest number of groups that can be made so that each group has the same number of children? How many children will be in each group of boys? How many children will be in each group of girls?



2. Amira and her friends are going on a picnic. Amira wants to make snack packs of apples and candy to take on the picnic. She has 24 apples and 36 small bags of candy. What is the greatest number of snack packs Amira can make if each pack must have exactly the same number of apples and exactly the same number of bags of candy with no snacks left over? How many apples will be in each snack pack? How many bags of candy will be in each snack pack?

3. Mohab is making flower arrangements. He has 7 roses and 14 daisies. If Mohab wants to make all the arrangements identical and have no flowers left over, what is the greatest number of flower arrangements that he can make? How many roses and how many daisies will be in each flower arrangement?

4. Find the greatest common factor (GCF) of 40 and 50.

5. Find the GCF of 10 and 24.

6. Find the GCF of 33 and 11.

CONNECT

Writing About Math Describe how a number and its factors are related. Use numbers, words, and symbols to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Identifying Multiples of Whole Numbers

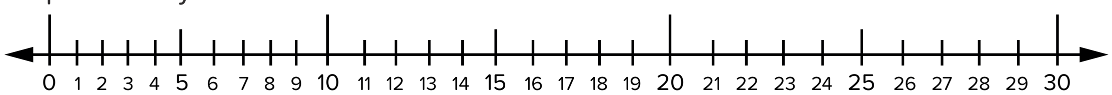
Learning Targets

- I can define **multiples** of whole numbers.
- I can identify multiples of whole numbers.

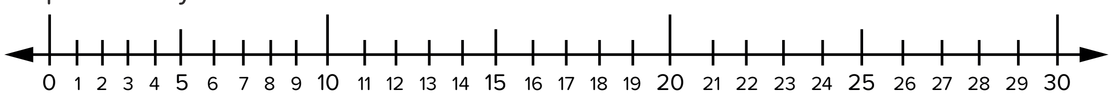
ACCESS

Skip Counting on a Number Line Draw a line connecting each number to show skip counting on the number line. Start at 0 each time.

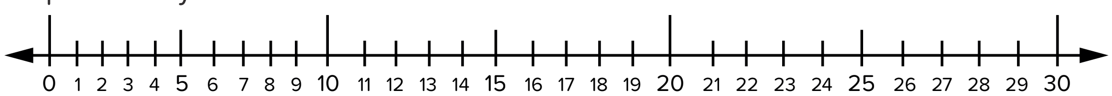
1. Skip count by 2 on the number line.



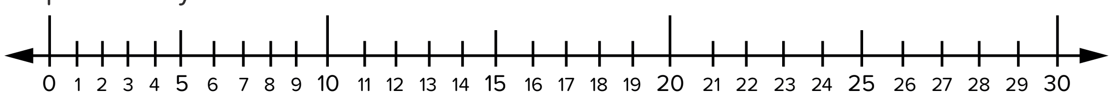
2. Skip count by 3 on the number line.



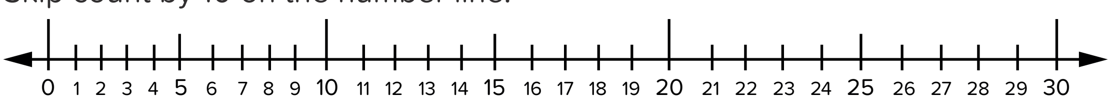
3. Skip count by 4 on the number line.



4. Skip count by 5 on the number line.



5. Skip count by 10 on the number line.



BUILD

Color the Multiples Use the Hundreds charts provided by your teacher to color the multiples.

1. Skip count and color the multiples of 2.
2. Skip count and color the multiples of 3.
3. Skip count and color the multiples of 4.
4. Skip count and color the multiples of 5.
5. Skip count and color the multiples of 6.
6. Skip count and color the multiples of 7.
7. Skip count and color the multiples of 8.
8. Skip count and color the multiples of 9.

Find the Patterns Use Hundreds Charts to help you identify patterns in the multiples of 2, 3, 4, 5, 6, 7, 8, and 9. Then, share your observations about the patterns with a partner. Record your observations.

CONNECT

Writing About Math Tahani takes the bus home from school every day, but it does not take her directly to her house. After the bus drops Tahani off, she must walk the rest of the way home. The bus she takes stops every 4 kilometers as it leaves the school. If Tahani lives 18 km from school, how far does she have to walk home from the bus stop? Draw a picture to represent your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Common Multiples

Learning Target

- I can identify **common multiples** of two numbers.

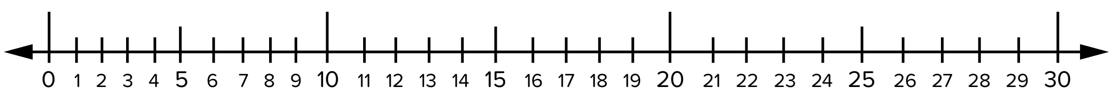
ACCESS



Bus Stop

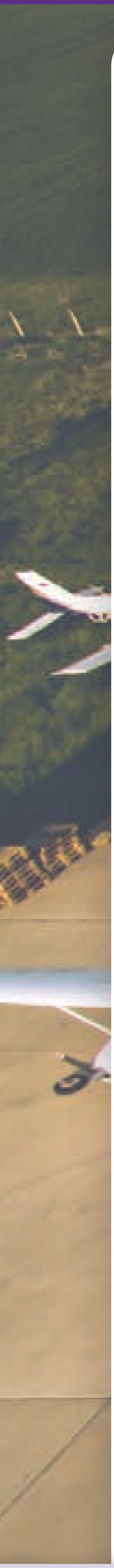
The Bus Stops Here Show where each bus stops on the number line.

- Bus 1 stops every 3 kilometers.
- Bus 2 stops every 5 kilometers.
- Bus 3 stops every 9 kilometers.



BUILD

Multiple Match Your teacher will assign you to work with a partner. One of you is Partner A and the other is Partner B. Look at your first card and write 10 multiples on it. Then, look at your partner's first card to see what multiples are in common. Record your answers.



1. Common Multiples of 5 and 2:

2. Common Multiples of 3 and 4:

3. Common Multiples of 8 and 2:

4. Common Multiples of 9 and 3:

5. Common Multiples of 2 and 6:

6. Common Multiples of 1 and 9:

7. Common Multiples of 4 and 5:

8. Common Multiples of 8 and 4:

9. Common Multiples of 5 and 3:

See the Similarities List the multiples for each pair of numbers until you find the first two common multiples for each pair.

1. 5 and 7: ______________________
2. 6 and 9: ______________________
3. 6 and 8 ______________________
4. 4 and 7: ______________________

CONNECT

Writing About Math What is the relationship between a number and its multiples? Use examples to support your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Relationships between Factors and Multiples

Learning Targets

- I can explain the relationship between factors and multiples.
- I can determine if a number is a factor or a multiple of another number.

ACCESS

Multiples Riddles Read each riddle and solve. There may be more than one answer.

1. The number is an odd number. It is a multiple of 3 and 5. It is greater than 20. What number is it?

___

2. The number is an even number. It is a multiple of 4 and 8. It is between 10 and 20. What number is it?

___

3. The number is an even number. It is a multiple of 3, 4, and 6. What number is it?

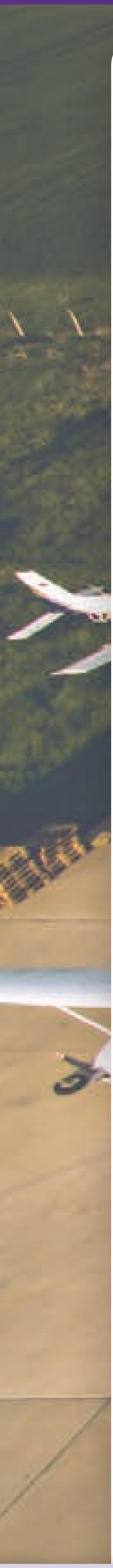
___

BUILD

Making Connections Think about the relationships between the numbers in each group. Write at least two sentences describing what you notice. Be ready to share your thinking.

1. 3, 6, and 12

2. 4, 8, 16, and 24



3. How are factors and multiples related?

Factors and Multiples Game Play this game with a partner. Place the factors and multiples cards face down in a pile and shuffle them. Choose one card. One partner writes factors of the number, the other writes multiples. Show each other your work and record your answers in the boxes. Choose another card and switch roles.

Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:
Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:
Number: Factors: Multiples:	Number: Factors: Multiples:	Number: Factors: Multiples:

Photo Credit: Allexanderh / Shutterstock.com

CONNECT

Writing About Math Reflect on what you have learned about factors and multiples. How do factors and multiples relate to multiplication facts? Use numbers, words, and symbols to support your reasoning.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

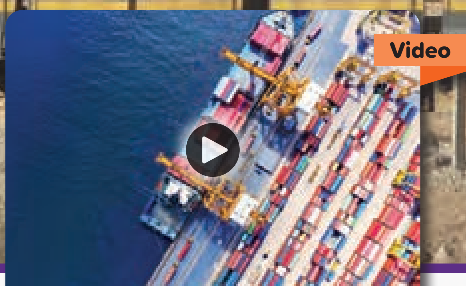
UNIT

7

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 7

Multiplication and Division: Computation and Relationships



Container Port

Unit Video Questions

The video Container Port shows how goods are stored and transported around the world in arrays. Imagine you have to calculate how many goods are being transported in large containers.

Quick Code egm4030

- ☐ How could you use multiplication to calculate large quantities like those in the shipping containers?
- ☐ How could you use division to group large quantities evenly into different containers?

LESSON 1

The Area Model Strategy

Learning Targets

- I can use an **area model** to represent two-digit by one-digit multiplication.
- I can explain how I use place value to multiply.

ACCESS

Notice and Wonder Look at the image that follows. Write down something that you notice and something that you wonder about the image.



I notice ______________________________________.

I wonder ______________________________________.

BUILD

Quick Draw Use a quick draw to solve the problems that follow.



River Boat on the Nile

Photo Credit: erichon / Shutterstock.com

1. Twenty-two passengers can fit on each river bus at a time. What is the maximum number of passengers the river bus can carry if it makes 5 trips?

2. 17 x 4 ____________   3. 21 x 3 ____________   4. 14 x 5 ____________

Multiplying with the Area Model Draw an area model to solve the problems that follow.

1. The route that the river bus travels is 58 kilometers long. How many kilometers does the river bus travel if it follows this route 9 times a day?

2. 35 x 7 ____________ 3. 91 x 4 ____________ 4. 88 x 6 ____________

CONNECT

Error Analysis Examine the student work that follows. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

A student solved the problem 36 x 8 in the following way:

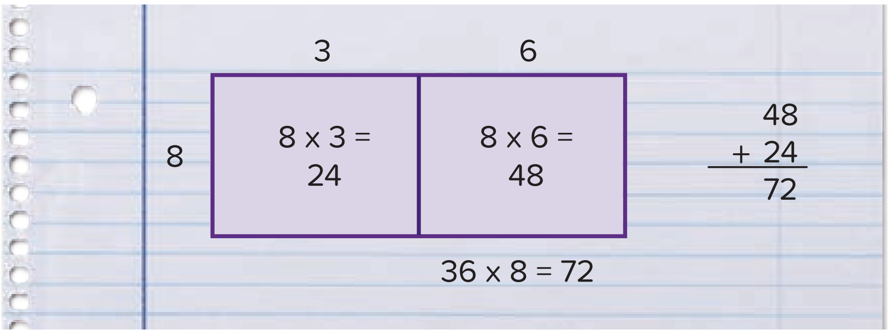


Photo Credit: erichon / Shutterstock.com

Explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

The Distributive Property

Learning Targets

- I can use an area model to multiply a one-digit number by a whole number with up to four digits.
- I can explain the **Distributive Property of Multiplication**.
- I can apply the Distributive Property of Multiplication to solve multiplication problems.

ACCESS

Decomposing Numbers Fill in the missing number for each decomposition.

1. 536 = 500 + __________ + 6
2. 1,275 = __________ + 200 + 70 + 5
3. 264 = 60 + 4 + __________
4. 7,625 = 5 + 7,000 + 20 + __________
5. 357 = 50 + __________ + 7

BUILD

The Distributive Property and Area Models Use the area model to solve each problem.

1. 249 x 5
2. 4,734 x 5
3. 530 x 7
4. 2,391 x 8

Let's Try It Use numbers and symbols to solve each problem. Draw an area model to help you if necessary.

	Problem	Numbers and Symbols	Area Model
1.	32 x 7		
2.	5 x 483		
3.	7 x 723		
4.	1,673 x 8		

CONNECT

Making Connections Read the problem. Solve using an area model or using numbers and symbols. Be prepared to share your thinking.


Bus in the Desert

A city bus is 1,280 centimeters long. What is the length of 3 city buses?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3
The Partial Products Algorithm

Learning Target

- I can use the **partial products algorithm** to multiply a one-digit number by a whole number with up to four digits.

ACCESS

The Amazing Race Write as many different ways as you can to represent the number 136. Use a separate box for each representation.

BUILD

Partial Products Use the area model to solve the problem. Then, copy the partial products algorithm solution modeled by your teacher.

Example: 731 x 4

Area Model	Partial Product Algorithm

Problem	Partial Products	Area Model
7 x 59		
624 x 4		
6 x 3,293		

Fill in the Blanks Fill in the blanks with the missing numbers.

1.
```
      239
  x     7
  -------
    1,400  (________ x ________)
      210  (________ x ________)
  +    63  (________ x ________)
  -------
    1,673
```

2.
```
        6,421
  x         6
  -----------
       36,000  (________ x ________)
  ___________  (6 x 400)
          120  (6 x ________)
  + _________  (6 x 1)
  -----------
  ___________
```

3.

```
      2,523
x         5
-----------
     10,000   (________ x ________)
   ________   (5 x 500)
        100   (5 x ________)
+  ________   (5 x 3)
-----------
   ________
```

CONNECT

Error Analysis Examine the student work that follows. Do you agree or disagree with the student's work and solution?

Solve the problem using the partial products algorithm.

Student's work:

```
    328
x     4
-------
     32  (8 x 4)
      8  (2 x 4)
+    12  (3 x 4)
-------
     52
```

Photo Credit: erichon / Shutterstock.com

What did the student do correctly?	What did the student do incorrectly? Why do you think they made this error?	Try to solve the problem correctly. Explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4
Multiply by a one-Digit Number

Learning Targets

- I can estimate products.
- I can use the **standard algorithm** to multiply a one-digit number by a whole number with up to four digits.

ACCESS

Similarities in Models Estimate the products of the two problems. Then, solve using the method assigned by your teacher.

1. 64 x 7

   Estimate:

   Solved Answer:

2. 132 x 8

   Estimate:

   Solved Answer:

BUILD

Using the Standard Algorithm Estimate the product for Problems 3–8. Then, solve using the standard algorithm. Multiply using another strategy to help you if necessary.



Cars on a Bridge

3. 32×3

Estimate:

Answer:

4. 17×6

Estimate:

Answer:

5. 134×2

Estimate:

Answer:

6. 758×3

Estimate:

Answer:

7. $1{,}349 \times 2$

Estimate:

Answer:

8. $2{,}327 \times 4$

Estimate:

Answer:

CONNECT

Writing About Math Three students tried solving 328 x 2 using the standard algorithm. Explain who you think solved the problem correctly, and identify at least one error in another student's solution.

Student 1	Student 2	Student 3
328 x 2 = 646	(carry 1) 328 x 2 = 656	(carry 1) 328 x 2 = 746

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5
Multiply a Two-Digit Number by a Multiple of 10

Learning Targets

- I can identify patterns when multiplying two multiples of 10.
- I can multiply a two-digit number by a multiple of 10.
- I can assess the reasonableness of an answer using estimation and mental math.

ACCESS

Mental Math Read each question. Circle your answer. Be prepared to explain your reasoning.

1. Is 56 x 4 closer to 200 or closer to 2,000? 200 2,000
2. Is 156 x 4 closer to 500 or closer to 5,000? 500 5,000

BUILD

Ten Times Predict what you think will happen when you multiply two multiples of 10 together.

30 x 5 = 150	30 x 50 = ________
2 x 80 = 160	20 x 80 = ________
70 x 7 = 490	70 x 70 = ________
50 x 60 = ________	90 x 70 = ________
40 x 40 = ________	60 x 30 = ________

Multiplying a 2-Digit Number by a Multiple of 10 Solve each problem using the area model strategy, the partial products algorithm, or the standard algorithm. Use estimation to make sure that your answer is reasonable.

Example: A group of 38 people want to travel by bus. Each bus ticket costs 30 LE. How much do they need to pay in all?


Buses Parked at a Pyramid

	Problem	Area Model	Numbers and Symbols
1.	40 x 62		
2.	70 x 55		
3.	54 x 30		
4.	40 x 78		
5.	44 x 20		
6.	15 x 30		
7.	10 x 40		
8.	72 x 40		

CONNECT

Error Analysis Examine the student's work. Is their answer reasonable? How do you know? Explain your thinking.

22 x 50

(20 + 2) x 50

(20 x 50) + (2 x 50)

100 + 100

200

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6
Exploring Remainders

Learning Targets

- I can identify the **dividend**, **divisor**, and **quotient** of a division problem.
- I can solve division problems.
- I can explain what a **remainder** represents in a division problem.

ACCESS

Compare and Connect Read each problem with a partner. Answer each problem.

1. There are 8 teams playing soccer. There are 9 students on each team. How many students are there in all?

2. There are 72 students on the field. They want to make teams with 9 students on each team. How many teams will they be able to make?

3. There are 72 students on the field. They want to split into 8 teams. How many students will be on each team?

4. How are the problems alike? How are they different?

BUILD

What Is Left? Draw a picture to show your thinking.

Saleem brought 15 pies to give to 4 of his friends. How can Saleem share the pies equally?

Equation ______________________________

Getting to Zamalek Write equations that show how many of each form of transportation you would need to get the people to their event. Note if there would

be people left out (remainder). Draw a picture to help you if necessary.


Zamalek Island

Thirty-two people need to travel to a special event in Zamalek. There are many different ways they can travel to the event. They can only choose one of the ways to travel for the whole group of people. Look at all of the forms of transportation they can take on the chart.

Form of Transportation	How Many People Can Fit on Each	Equation
Microbus	9	
Motorbike	2	
Car	4	
Van	7	

Which form of transportation should the group take to the event? Explain your answer.

CONNECT

Going to a Swim Meet The swim team is taking a bus to a swim meet. Each bus seats 40 students. Sixty students will attend the meet. How many buses are needed? Use numbers, words, and symbols to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

Photo Credit: (a) Pat Shrader / Shutterstock.com, (b) Mohamed Hakem / Shutterstock.com

LESSON 7

Patterns in Division

Learning Target

- I can use place value, multiplication facts, and patterns with zeros to divide multiples of 10, 100, and 1,000 by one-digit divisors.

ACCESS

HANDS-ON ACTIVITY

Division Array Game

Follow the instructions to create arrays to show division problems.

Materials per two players

- Number cards 6–25
- One 6-sided number cube
- One piece of graph paper

Objective of the game

- To have the highest total score

Directions

1. Shuffle the number cards. Place the deck with the numbers facing down on the table.
2. Player A draws a number card. This number becomes the dividend.
3. Player A rolls the number cube. The number on the number cube is the divisor. Fill in this many squares per row on the graph paper until you reach the dividend. You may have squares left over that do not fill a whole row. These are remainders.
4. Fill in the information in the chart, including if there are any leftover squares.

HANDS-ON ACTIVITY

Division Array Game

5. Player A's score is the number in the "number of rows" column. If all the squares were used in the array (no remainders), then Player A's score is double the number of rows.
6. Keep track of the score in the chart. The player with the highest total score after 5 rounds wins.

Round	Total Number of Squares (Dividend)	Squares per Row (Divisor)	Number of Rows (Quotient)	Leftover Squares (Remainder)	Score
Example	23	4	5	3	5
1					
2					
3					
4					
5					
				Total Score	

BUILD

Division Patterns Label the parts in the equation using the words divisor, dividend, and quotient. Then, look for patterns to complete the remaining problems. The first problem in the table is an example that is filled in for you.

600 ÷ 3 = Answer

600 is called the ______________________.

3 is called the ______________________.

The answer is called the ______________________.

How did you use facts and patterns you know to help you solve the problems?

Equation	Related Fact	Quotient
600 ÷ 3	6 ÷ 3 = 2	200
150 ÷ 5		
1,200 ÷ 6		
200 ÷ 4		
700 ÷ 7		
6,400 ÷ 8		
4,500 ÷ 9		
270 ÷ 3		

CONNECT

Riding the Metro

There are 8,100 people that need to get to work on Monday morning at 7:00 a.m. They all want to take the Metro to work. There are 9 cars on each Metro. If 90 people can fit in each car, can all the people take the same metro to work? Explain your thinking using numbers, words, and symbols.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8
The Area Model and Division

Learning Target

- I can use area models to represent and solve division problems.

ACCESS

Target Number Your teacher will give you a number card. You will use your number to help create a target number.

BUILD

Understanding the Area Model Solve each problem using an area model.

1. An organization donated 89 books to a school. The books will be shared among 6 classrooms. How many books will each classroom get?

2. Rashida saved 545 LE to buy a toy car. She did this by saving 5 LE every day she worked around her neighborhood. How many days did she have to work to save enough money to buy a toy car?

3. Amir bought a book of stickers. There were 92 stickers in the book. He wanted to give them to 4 of his friends. How many stickers will each of his friends get?

CONNECT

Writing About Math There are 492 cars that need to park at the stadium. The stadium has 4 parking lots. The stadium wants the same number of cars to park in each lot. How could you use Problem 3 to help you solve 492 ÷ 4? Use words, numbers, and symbols to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 9

The Partial Quotients Algorithm

Learning Target

- I can use the partial quotients algorithm to solve division problems.

ACCESS

Model Match Write the division problem that matches each area model. Remember to include the quotient and remainder, if there is one.

1\.

6	300	60	18
	50	10	3

2\.

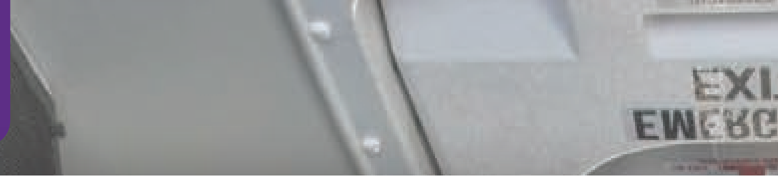
4	4,000	1,200	400	28	
	1,000	300	100	7	R3

BUILD

Partial Quotients Algorithm Solve each problem using the partial quotients algorithm. Decide who will solve each problem with your group. You will each teach each other how to solve your problem.

Example

4 | 897



Problem 1

4 ⟌ 892

Problem 2

5 ⟌ 590

Problem 3

3 ⟌ 1,216

Problem 4

6 ⟌ 925

CONNECT

Writing About Math Look at the two different strategies for solving 812 ÷ 4. Describe how the area model and the partial quotients algorithm are similar and how they are different.

812 ÷ 4 = 203

Area Model

4	4 x 200 = 800	4 x 3 = 12	0

200 + 3 = 203

Partial Quotients

```
4 | 812
    800   200
    ---
     12
     12     3     200 + 3 = 203
    ---
      0
```

Photo Credit: Pat Shrader / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 10
The Standard Division Algorithm

Learning Targets

- I can estimate quotients using place value and patterns in multiplication and division.
- I can use the standard algorithm to solve division problems.

ACCESS

Let's Estimate Use estimation to answer the questions. Circle your answer. Be ready to explain your reasoning.

Will 1,836 ÷ 3 be closer to 60 or 600?

Will 7,158 ÷ 3 be closer to 2,000 or 3,000?

Will 736 ÷ 4 be closer to 100 or 200?

Will 491 ÷ 4 be closer to 120 or 150?

BUILD

Find the Similarity Estimate the quotient and then do a Quick Draw of the problem.

1. 68 ÷ 4

   The quotient will be between __________ and __________.

   Quick Draw

   Standard Algorithm

2. 457 ÷ 3

   The quotient will be between __________ and __________.

   Quick Draw

Standard Algorithm

Let's Try It Solve the problems using the standard algorithm.

1. 454 ÷ 3

2. 778 ÷ 2

3. 368 ÷ 3

4. 4,858 ÷ 4

CONNECT

Making Connections

A train has 784 seats for passengers. If there are 7 cars on the train and each car has the same number of seats, how many passengers can sit in each car? Solve the problem using at least two different strategies.

784 ÷ 7

First strategy

Second strategy

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 11
Division and Multiplication

Learning Targets

- I can use properties of place value to accurately record quotients.
- I can use multiplication to check answers to division problems.

ACCESS

Spot the Difference Study the two division problems solved using the standard algorithm. Identify as many differences as you can between the two problems.

313	92 R1
3) 939	3) 277
− 900	− 270
39	7
− 30	− 6
9	1
− 9	
0	

BUILD

Place Value and the Quotient First, circle the problems you think will have a quotient with fewer digits than the dividend. Then, estimate the quotient and solve each problem using the standard algorithm for division. Think about where to place the first digit in the quotient.

1. 346 ÷ 5

   The quotient is between __________ and __________.

   Solution

2. 1,266 ÷ 6

   The quotient is between __________ and __________.

   Solution

3. 834 ÷ 3

   The quotient is between __________ and __________.

   Solution

4. 1,429 ÷ 7

   The quotient is between __________ and __________.

   Solution

5. 4,590 ÷ 3

   The quotient is between __________ and __________.

   Solution

6. 562 ÷ 8

   The quotient is between __________ and __________.

   Solution

Checking Your Answer Select three problems from Place Value and the Quotient to check.

CONNECT

From Cairo to Alexandria Kazem wants to travel from Cairo to Alexandria, which is a distance of 218 kilometers. He plans to stop 3 times along the way. After how many kilometers should he plan to stop? Do not solve this problem. Instead, explain how you would help a friend solve it. What steps would you tell them to take? How should they check their answer? Record your thinking.

Check Your Understanding

Follow your teacher’s instructions to complete this activity.

UNIT

8

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 8
Order of Operations


Video

Order

Unit Video Questions

Quick Code
egm4091

Omar and Mariam are taking a school trip to a factory. They learn how the factory makes cars. The guide explains the order of each step and why the order matters. After the school trip, Omar and Mariam want to know what else has an order and where the order matters.

- ☐ What has an order in your school or home?
- ☐ Does the order matter? What happens if the order is changed?
- ☐ In mathematics, are there any operations in which order matters? What are they? Give examples of what happens if the order is changed.

LESSON 1

Order of Operations

Learning Target

- I can use the order of operations to solve problems with multiple operations.

ACCESS

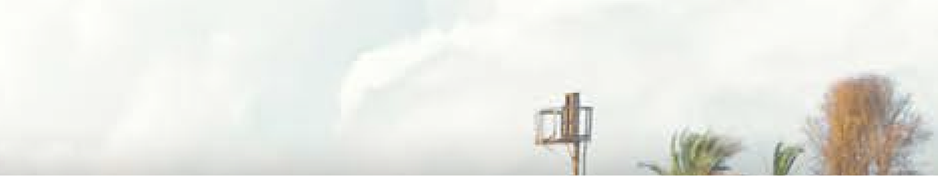
Which Does Not Belong? Solve the problems. Then, think about which problem does not belong in the set. Highlight or circle the problem you think does not belong and explain your thinking.

1. 6 x 4 – 4 = ____________
2. 100 – 80 x 1 = ____________
3. 60 + 20 – 50 = ____________
4. 2,356 – 2,336 = ____________

BUILD

Find the Answer Work with your partner to solve each problem. Locate the correct answer and write the equation under it. If the answer is not listed, rewrite the problem under "Other."

Order of Operations
Parentheses
Multiplication and Division (left-to-right)
Addition and Subtraction (left-to-right)



2 + 4 x 6	24 – 8 ÷ 4 + 6	15 ÷ 5 + 4 + 1
48 ÷ 4 + 9	36 ÷ 9 + 4	15 – 7 + 2 + 6
7 + 70 ÷ 10 – 2	99 – 10 x 9 + 7	8 x 2 + 24 – 12
49 – 7 x 6 + 4	12 – 72 ÷ 12 + 2	24 + 36 ÷ 6 + 2
8 x 3 + 6 + 2	80 ÷ 10 + 6 – 3	40 – 7 x 5 + 2

8

11

16

28

32

Other

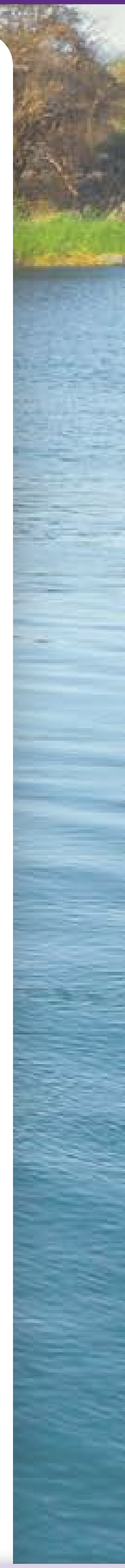


Photo Credit: givaga / Shutterstock.com

CONNECT

Who Is Correct? Saleem and Sarah both solved the problem 74 – 61 + 8 x 5. Saleem says the answer is 105 and Sarah says the answer is 53. Who is correct? How do you know? Help the person who is not correct realize their mistake.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

The Order of Operations and Story Problems

Learning Targets

- I can use the order of operations to solve problems with multiple operations.
- I can write and solve an equation to represent what is happening in a multistep story problem.

ACCESS

Number Talk Solve the problems. Then, rewrite each problem more efficiently.

1. 67 + 67 + 67 + 67 + 67 – 15 = ______________________

2. 568 + 78 – 4 – 4 – 4 – 4 – 4 – 4 – 4 – 4 = ______________________

BUILD

The Order of Operations and Story Problems Use numbers and symbols to represent what is happening in each problem, and then solve. Remember the order of operations.

1. Abdullah loves collecting stamps. He received 246 stamps for his birthday. He kept 25 of the stamps and now he wants to give the rest to 6 of his friends. How many stamps will each friend get if they share them equally?

2. Maha walked 14 kilometers every day for 2 weeks. The next week she walked 56 kilometers. How many kilometers did she walk over those 3 weeks?

3. Ashraf has to take the bus to work. It takes 27 minutes to get to the bus stop near his job. Then, he has to walk for 12 minutes from the bus stop to his place of work. How many minutes does Ashraf spend going to work during a 5-day week?

4. A group of tourists are taking a tour of Alexandria. There are 172 tourists and 8 tour guides in the group. They want to travel to the pyramids in microbuses. Each microbus fits 9 people. How many microbuses will they need in order to get everyone to the pyramids?

5. Sita wants to bake berry muffins. Each muffin will have 6 berries in it. She buys 198 berries from the store. On the way home, she eats 17 of the berries. How many muffins can she make with the berries she has left?

CONNECT

Writing My Own Problem Write a story problem that can be represented by (50 – 36) ÷ 4.

Check Your Understanding

Follow your teacher's instructions to complete this activity.